

**Ministry of Road Transport & Highways
Government of India**

Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of (i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120 in Bihar on EPC Mode

***REQUEST FOR PROPOSAL
(RFP)***

(International Competitive Bidding)
July, 2016

INDEX

Sl. No.	Contents	Page No.
1	Notice for inviting the proposals for Consultancy services	1
2	Letter of Invitation	2-15
3.	Annex - I : List of Project along with Package Nos.	16
4.	Data Sheet	17-22
5.	Appendix - I : Terms of Reference	23-66
6.	Supplement -I: Additional Requirements for Hill Roads	67-69
7.	Supplement - II: Additional Requirements for Bridges	70-74
8	Supplement – III: Additional requirement for safety audit	75-77
9.	Enclosure - I : Manning Schedule	78
10	Enclosure - II : Qualification Requirements of Key Personnel	79-82
11.	Enclosure - III : Schedule for Submission of Reports and Documents	83
12.	Appendix - II : Formats for Proof of Eligibility	84-90
13.	Appendix - III : Formats for Technical Proposals	91-103
14.	Appendix - IV : Formats for Financial Proposals	104-110
15.	Appendix - V : Draft Contract Agreement	111-148

Ministry of Road Transport & Highways Government of India

MORT&H intends to take up the Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of **(i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120** in Bihar on EPC / PPP Mode. The details of the roads are as follows:

S. No.	State	Stretch	Approx. Length	Package No.	Period of assignment
1	Bihar	Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of (i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120 in Bihar on EPC Mode.	154 km	DPR/BIHA R/NHD-PAT/07	08 months

2. Proposals are hereby invited from Empanelled Consultants by Ministry of Road Transport & Highways for Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of **(i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120** in Bihar on EPC / PPP Mode. The Letter of Invitation (LOI) and the fee for the document amounting to **Rs. 5,000 (Rupees Five Thousand only) in the form of Demand Draft favouring ‘Regional Pay & Accounts Officer, Lucknow’** and payable at **Lucknow** must be furnished a separate envelop while submitting the proposal.

Request for Proposal (RFP) including Terms of Reference (ToR) is available online on e-tender portal of MoRT&H <http://www.morth.nic.in> or <https://morth.eproc.in> from **28.07.2016 to 11.08.2016** (up to **17.00 Hrs. IST**). Bid must be submitted online at e-tender portal of MoRT&H <https://morth.eproc.in> on or before **12.08.2016 (upto1500hrs IST)**

3. The following schedule is to be followed for this assignment:

i) Deadline for downloading of bid:	11.08.2016 (1700 hrs)
ii) Last date for submission of queries	04.08.2016
iii) Pre bid meeting:	05.08.2016 (1130 hrs)
iv) Deadline for Submission of bids :	12.08.2016 (1500 hrs)
v) Last date for submission of hard copies of EMD and cost of Bid	19.08.2016 (1500hrs)
vi) opening of Proof of Eligibility	19.08.2016 (1600 hrs)

Yours sincerely,

(Sunil Kumar Singh),
Executive Engineer, NH Division, Patna,
Road Construction Department, Bihar
Rajbanshi Nagar, Patna-800023
E Mail ; eenhpatnawestrcd@gmail.com
Mob:- 9470001308

Letter of Invitation (LOI)

No. DPR/BIHAR/NHD-PAT/07

Dated: 08.07.2016

Dear Sir,

Sub: Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of **(i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120** in Bihar on EPC / PPP Mode as per the details given in Annexure-I.

1.1.1 Ministry of Road Transport and Highways, Government of India through Road Construction Department (NH Wing), Government of Bihar has decided to take up the Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of **(i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120** in Bihar on EPC / PPP Mode. MoRT&H accordingly proposes to procure the services of a Technical Consultants for carrying out suitable **DPR and** render consultancy services for proper structuring and implementation of the project on EPC / PPP Mode until Declaration of Appointed date.

1.1.2 Chief Engineer (NH) RCD Bihar through concerned Executive Engineer will supervise the project at field level.

1.1.3 Standards of output required from the appointed consultants are of international level both in terms of quality and adherence to the agreed time schedule.

1.2 A brief description of the assignment and its objectives are given in the enclosed *Terms of Reference*.

1.3 The MoRT&H through RCD (NH) Wing Bihar invites Proposals (the “**Proposals**”) *through e-tender* (on-line bid submission) for selection of Technical Consultant (the “**Consultant**”) who shall prepare **DPR and** then render consultancy services for proper structuring and implementation of project on EPC/PPP Mode. **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 can not submit two proposals/ bids for the same package.** 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 package for which a Consultant with “a Particular Team” applies should be clearly mentioned. For avoidance of doubt, it is clarified that if a consultant becomes H1 in a particular package then his financial bid in other remaining packages shall not be considered if consultant has proposed the same team or team leader. Financial proposal for the work is 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 work would be determined on the basis of Quality cum 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 work only.

- 1.4 The Consultants either in sole capacity or in JV may include an Associate. *Joint Venture shall not have more than two firms*
- 1.5 Prospective applicants may visit the Site and review the available data at any time prior to submission of proposal. For this purpose, The bidder should carefully study all the sections herein including the scope of the work along with the technical specification. Bidder may also inspect the site and satisfy themselves on their own as to the hydrological, climatic and physical conditions prevailing at site, the nature, extent and practicability of the work and all existing required roads and other means of communications and access to the site, whether by water or land, availability of housing and other facilities, the availabilities of different materials and their adequacy, labour etc and all other requisite local conditions They shall themselves obtain all necessary information as to risk contingencies and other circumstances, which may affect or influence their tender. They are also encouraged to pay a visit to the office of the RO Patna for any clarification in respect of the work before submitting their proposal.
- 1.6 Financial Proposals will be opened for all technically qualified consultants in accordance with clause 5.1 hereof. The consultancy services will be awarded to the consultants 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) Client 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/Association 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.*

- iv. *Delineation of duties/ responsibilities and scope of work to be undertaken by each firm alongwith resources committed by each partner of the JV/Association for the proposed services;*
- v. *An undertaking that the firms are jointly and severally liable to the Employer for the performance of the services and,*
- vi. *The authorized representative of the joint venture/Association*
- vii. *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 firm which preferably has 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.

1.8.5 With respect to the above DPRs, following additional guidelines shall be followed. Applications should be submitted by the bidders

It has been decided to implement the concept of “Integrity Pact”. The Integrity Pact (IP) envisages an agreement between the prospective bidders and the buyers committing the persons/officials of both the parties, not to exercise any corrupt influence on any aspect of the contract. The IP also envisages empanelment of the Independent External Monitors (IEM). The IEM may review independently and objectively whether and to what extent parties have complied with their obligations under the pact. Accordingly, a draft Integrity Pact format is enclosed with the RFP. All interested Applicants are requested to sign Integrity Pact and submit the same along with RFP document.

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 ‘Executive Engineer NH Division Patna’ payable at Patna (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 Department 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 M/oRT&H's 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 M/oRT&H 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 Client, in writing, by **04.08.2016 (1700Hrs)**. Pre Bid Meeting shall held on **05.08.2016** at the time and place mentioned in the data sheet. Any request for clarification in writing or by tele-fax must be sent to the Client's address indicated in the Data Sheet. The Client will respond by hosting the clarifications on Ministry's website.
- 2.3 At any time before the submission of proposals, the Client 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. The amendment will be posted in the website and will be binding on the applicants. The Client may at its discretion extend the deadline for the submission of proposals.

3. Preparation of Proposal

The proposal must be prepared in three parts

Part 1: Proof of eligibility

Part2: 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 7 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 datasheet for the project size preferably in terrain of similar nature as that of proposed project shall be submitted. Certificate should indicate clearly the firms Design/DPR experience, in 2/4-/6- laning of highway, structures like bridges, Viaducts, tunnels, hill slope stabilization, rock bolting, ground improvement, 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 **'Regional Pay & Accounts Officer, Lucknow'** and payable at **Lucknow** must be furnished in a separate envelope while submitting the proposal.
 - (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.30days 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) *Topographic Survey*
 - b) *Pavement Investigation*
 - c) *Geo-technical Investigation*

In case the consultant envisages to outsource 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 client 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 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 Ministry/NHAI/IAHE projects upto 2 years may be taken by M/o RT&H 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.*
- v. *The age limit for key personnel is 70years as on the date of bid submission except for Senior survey engineer in which 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 MORT&H, NHAI and IAHE*
- 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 M/O RT&H. 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 and cost of insurance specified in the Data Sheet.

3.3.3 **Costs shall be expressed in Indian Rupees in case of domestic Consultant and in Indian Rupees and US Dollars in case of foreign Consultant.** The payments shall be made in Indian Rupees by the M/o Road Transport & Highways through Regional Office Patna and the Consultant themselves would be required to obtain foreign currency to the extent quoted and accepted by M/o Road Transport & Highways. 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 equipment / 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 an 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.

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 MORTH for 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 work with one team only. The work for which a Consultant with “a Particular Team” applies should be clearly mentioned in their proposal. 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 MORT&H on or before the deadline for submission of bids. The envelope must be clearly marked:

Consultancy Package Nos. Project Name

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), Bid Security of required amount and validity as mentioned in the RFP and Proof of Payment of application processing fees amounting to Rs. 1295/- to M/s. C-1 India Pvt. Ltd. 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 packages .**
- 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 MORT&H. 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) The proposal is accompanied by Document fee
 - 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 also 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 MORTH shall invite fresh bids for this package. For financial evaluation, total cost of financial proposal excluding Service Tax shall be considered. Service Tax shall be reimbursable separately.

- 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 client feels that the work cannot be carried out within overall cost of financial proposal, the proposal can be rejected. The client 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, duties, fees, levies and other charges imposed under the applicable law & applied to foreign components/ resident consultants.
- 5.3.3 For a package in which 2 or more firms are eligible for opening of Financial proposals, 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:
 $SF = 100 \times FM / F$
(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:
 $S = ST \times T + SF \times f$, 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)**.
- 5.6 **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. Procedure to be followed for awarding work shall be based on QCBS.**

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 MORTH.** 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 Client 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 Client 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 Client 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 Client 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 Client expects all of the proposed key personnel to be available during implementation of the contract. If 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 M/o RT&H during contract negotiations / contract implementation , the following shall apply (i) for total replacement upto 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 MORT&H/NHAI/IAHE 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 MORTH or in case a consultant withdraws without starting / completing the negotiations with MORTH, 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 Nationalised 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 Nationalised 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 **three years** beyond the date of completion of services. **The Bank Guarantee will be released by M/oRT&H upon expiry of 3 years beyond the date of completion of services provided rectification of errors if any, found during implementation of the contract for civil work and satisfactory report by M/oRT&H in this regard is issued.** If a Consultant fails to submit the Performance Security (as specified above), it shall attract penalty i.e. 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 Client 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 Client 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 Client 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 Client shall keep the bidders informed during the entire bidding process

12. Confirmation

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

Thanking you.

Encl. as above

Yours sincerely,

**(Sunil Kumar Singh),
Executive Engineer, NH Division, Patna,
Road Construction Department, Bihar
Rajbanshi Nagar, Patna-800023**

Detail of the stretch proposed for DPR

S. No.	State	Stretch	Approx. Length (kms)	Package No.	Period of assignment
1	Bihar	Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of (i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120 in Bihar on EPC Mode.	154 km	DPR/BIHAR/NHD-PAT/07	08 months

DATA SHEET

(References to corresponding paragraphs of LOI are mentioned alongside)

1. **The Name of the Assignment is:-** Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of **(i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120** in Bihar on EPC / PPP Mode (refer para 1.1)

2. **The Name of the Client is:**

Ministry of Road Transport & Highways through
Chief Engineer (NH)
Road Construction Department
Government of Bihar

3. **The Duration of the Project:** **08 (Eight)** months

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

05.08.2016 (1130 Hrs IST)

Venue: Executive Engineer, NH Division, Patna, Road Construction Department, Govt. of Bihar, Rajbanshi Nagar, Patna – 800023

(Ref. Para 2.2)

5. **The Documents are:**

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

(Ref. Para 2.1)

6. **Bid Security:- Rs. 2.0 lakhs**

7. **Tax and Insurance**

(Ref. Para 3.3.2)

- (i). The Consultants and their personnel shall pay all taxes (including service tax), 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 Client shall be as per clause 3.4 of the 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)

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

(Sunil Kumar Singh),
Executive Engineer, NH Division, Patna,
Road Construction Department, Bihar
Rajvanshi Nagar, Patna-800023.
E Mail ; eenhpatnawestrcd@gmail.com
Mob:- 9470001308

The envelopes must be clearly marked:

- i. ORIGINAL PROPOSAL;
- ii. DOCUMENTS IN SUPPORT OF TECHNICAL & FEE; and,
- iii. DO NOT OPEN, EXCEPT IN PRESENCE OF THE EVALUATION COMMITTEE on the outer envelope.
- iv. Consultancy Package No. :-----
- v. Project Name :-----
- vi. Name and Address of Consultant

10. The date, time and Address of proposal submission are:

Date:- 19.08.2016
Time:- Upto1500hrs IST
Address:- Executive Engineer, NH Division, Patna
Road Construction Department, Govt. of Bihar, Rajbanshi Nagar, Patna –
800023
 (Ref. Para 4.4)

11. Proposal Validity period (days, date): 120 days (Ref. Para 4.5)

12. Evaluation criteria: (Ref. Para 3 & 5)

12.1 Technical Evaluation. (Ref. Para 3.1 & 5.1)

Table-1: Minimum Eligibility Requirements

S. No.	Minimum experience of preparation of DPR of Highways / Bridges in the last 07 years (NH/SH/Equivalent). Attach undertaking for any litigation history / and Arbitration	Annual average turnover

1	Firm should have experience of preparation of Detailed Project Report of Two/Four/Six lane projects of aggregate length equal to or more than the indicative length of the package(NH/SH or equivalent). Firm should have the minimum DPR experience of one project of Two/Four/Six lane projects experience equal to or more than 40% of the Project Length (NH/SH or equivalent). Firm should also have the experience of DPR of one major Bridge of 200m length.	Annual average turnover for last 5 years of the firm should be equal to or more than Rs.5 crores.
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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 have 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.

12.2 Second stage technical evaluation (Refer 5.2)

Table-2: Evaluation Criteria for Technical Proposal

SINo.	Description	Points	Break up details in
1	Firms Relevant Experience in last 7 years	20	Para12.2.1
2	Adequacy of Approach and Methodology	5	
3	Material testing, Survey & Investigation, Equipment and Software proposed to be used	5	
4	Qualification and Relevant Experience of the Proposed Key Personnel	70	
	Total	100	

The weightage points given to evaluation sub-criteria for qualifications and competence of key staff are as under:

Table-3: Weightage Points for Key Professionals

Description	Weight (%)	Break up details in
General Qualification	25	Para 12.2.2
Relevant Experience and Adequacy for the Project	70	
Employment with the Firm	5	
Total	100	

12.2.1 The number of points to be given under each of the evaluation criteria are:

(i)	Firms relevant experience in last 7 years (2009-10 onwards)	20 points	
			Points
	(a) Specific experience of the DPR consultancy related to the Assignment for eligibility		12
	(a)(i) Aggregate Length of DPR / Feasibility study of 2/4/ 6 lane projects (Minimum equal to indicative length of a package applied for)		6
	Indicative Length of a package applied for		4
	2 times Indicative Length of a package applied for		5
	3times Indicative Length of a package applied for		6
	(a)(ii) DPR for 2/4/6 laning projects each equal to or more than 40 % of indicative length of a package applied for		
		1 project	4
		2 projects	5
		3 projects	6
	b) DPR of Bridge having length more than 200 m. (Only Design of River Bridges shall be considered)		4
		One bridge	1
		Two bridges	2
		Three bridges	3
		Four bridges	4
	c) Specific experience of firms in terms of turnover		4
	Firm's Average Turnover of last 5 years \geq 10 crore	4	
	Firm Average Turnover of last 5years \geq 5 crore but $<$ 10 crore	3	
	Firm Average Turnover of last 5 years $<$ 5 crore	0	
		
		Total	20

Note:1. In case Feasibility Study is 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 counted both in (a) and in (b).

(ii) Adequacy of the proposed work plan and methodology in responding to the TOR
Sub criteria: 5

- | | | |
|-----|--------------------------------------|---|
| (a) | Site Appreciation | 2 |
| (b) | Comments on TOR | 1 |
| (c) | Team Composition and Task assignment | 1 |
| (d) | Methodology | 1 |

.....
Total 5

(iii) Material testing, Survey and investigation equipment and software proposed to be used (Outsourcing of Services/equipment shall be through Empanelled Consultants with MoRT&H wherever applicable) **5**

- | | | |
|----|--|-----|
| a) | Availability of in-house material testing facility | 1 |
| | Available | 1 |
| | Not available/outsourced | 0.5 |
| b) | Field investigation facilities | 2 |
| | Available | 2 |
| | Not available/outsourced | 1 |
| c) | Office Equipment and software | 2 |
| | Available | 2 |
| | Not available/outsourced | 1 |

Total 05

(iv) Qualification and competence of the key staff for adequacy of the Assignment **70**
The weight-age for various key staffs are as under:

SLNo.	Key Personnel	Points
1	Team Leader- Senior Highway Engineer	15
2	Senior Bridge Engineer	10
3	Highway cum Pavement Engineer	10
4	Material-cum-Geo-technical Engineer- Geologist	10
5	Traffic and Safety Expert	8
6	Senior Survey Engineer	6
7	Environment Specialist	6
8	Quantity Surveyor/Documentation Expert	5
	Total	70

(v)The technical proposal should score at least 75 points out of 100 to be considered for financial evaluation.

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

Sl No.	Description	Break up of points (in %)	Max points(in %)
1	General Qualification		25
	(i) Essential Educational Qualification	20	
	(ii) Desirable Educational; Qualification	5	
2	Relevant Experience and Adequacy for the Project		70
	(i) Total Professional experience	15 (max)	
	(ii) Experience in Highway Projects (Bridge Projects for Senior Bridge Engineer)	25 (max)	
	(iii) Experience in Similar Capacity	30 (max)	
3	Employment with the Firm		5
	Less than 1 year	0	
	1 year to 2 years	3	
	>2 years	5	
	Total		100

12.3 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) Fixed Exchange rate for conversion (for bid evaluation purpose only):
1 US \$=Rs. 65.00.
14. 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)

Appendix-I

Terms of Reference for Consultancy Services (TOR)

1. General

1.1 Ministry of Road Transport & Highways (MORTH) has decided to implement the Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of (i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120 in Bihar on EPC / PPP Mode.

1.3 Services of qualified firms empanelled by MORTH are invited for project preparation for improvement of this road to four lane/two lane with paved shoulders/two lane, with bypasses/realignment, drainage improvement duly taking into account environmental/social impacts of the proposed improvements. Most feasible and acceptable improvements are to be worked out with due analysis and in consultation with concerned authorities. Project reports for ROBs in replacement of level crossings on this NH are being separately prepared by different consultants which are to be dovetailed with these improvement proposals in close coordination with the ROB Consultants. The terms of reference for this assignment are as below.

1.4 The Consultant shall be guided in this assignment by the Manual of Specifications and Standards for Two-laning of highways through Public Private Partnership published by the Indian Roads Congress (IRC:SP:73-2015) (the “Manual”) and the Manual of Specifications and Standards for Four-laning of highways through Public Private Partnership published by MoRT&H (the “IRC:SP:87:-2014”) and these terms of reference.

1.5 However, as per the norms of Ministry of Road Transport & Highways (MoRT&H), Govt. of India, the implementation of the proposed scheme will be through EPC /PPP mode of construction. As such, the consultants are required to develop a suitable frame work of implementation of the proposed scheme through EPC / PPP mode of construction with relevant necessary modifications / alterations of the above documents and shall prepare necessary EPC / PPP agreement documents.

1.6 The Consultant shall be responsible for preparing the Schedules A to P of the EPC / PPP bid documents and for bringing out any special feature or requirement of the Project Highway referred to in the EPC bid or the Manual. The details and particulars to be specified in the Schedules shall be duly addressed and incorporated therein, in accordance with the provisions of the Manual (Refer to Appendix I of the Manual).

1.7 The Consultant shall assist the Authority and its 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.

1.8 The Consultant shall also participate in the pre-bid conference with the Bidders of the Project Highway and assist the Authority in clarifying the technical aspects arising from the Bid Documents including the Project report.

2. Objective

2.1 **To undertake survey/ investigations/ studies and prepare a Project Report for the Project Highway for four lanning/two lanning with paved shoulders/Two lanning**

including realignments/bypasses for the Project Highway in the State of Bihar including project facilities, facilitating assessment of most cost effective/ advantageous optimum solution enabling prospective bidders assess the Authority's requirements in a clear and unambiguous manner.

- 2.2 The Project Report would inter-alia include detailed highway design, design of pavement and overlay with options for flexible or rigid pavements, design of bridges, and cross drainage structures, quantities of various items, detailed G.A. drawings, detailed cost estimates, EPC schedules, economic and financial viability analyses, environmental feasibility, environmental action plans as appropriate and documents required for tendering the project on commercial basis through competitive bidding (on EPC mode) duly including the viability of the project on BOT (Toll/ Hybrid Annuity).
- 2.3 The DPR consultant should ensure detailed project preparation incorporating aspects of value engineering, quality audit and safety audit requirement in design and implementation. The consultant is expected to make effective use of modern technology for carrying out ground surveys and digital data for design of proposed Highway.
- 2.4 **Minimal adverse Environmental/ Social impacts along with superior operational efficiency and maintainability should be duly incorporated with project proposal.**
- 2.5 **Provide the Authority with a sound Engineering Solution scheme with a specific and firm cost estimate together with a scheme for phased development of the project road commensurate with financial viability.**
- 2.6 The project proposal/ project report shall be prepared with a view to ensure:
- (i) Improvement of Project Highway to Four lane /two lane/ two lane with paved shoulders including the option of different carriageway configurations in different sections with both flexible and rigid pavement options duly balancing the needs of minimizing environmental/Social impacts and improving the traffic flow/road safety.
 - (ii) Safety and level of service for the road users;
 - (iii) superior operation and maintenance enabling enhanced operational efficiency of the Project Highway;
 - (iv) minimal adverse impact on the local population and road users due to road construction;
 - (v) minimal adverse impact on environment;
 - (vi) minimal additional acquisition of land; and
 - (vii) Phased development of the Project Highway for improving its financial viability consistent with the need to minimise frequent inconvenience to traffic that may be caused if additional works are undertaken within a period of seven years from the commencement of construction of the Project Highway.
 - (viii) Provide the Authority with a sound Engineering solution scheme for the proposed highway stretch along with a realistic and firm Cost Estimate and EPC Bid documents as per standard practice in order to negotiate into the

implementation stage of the project.

- 2.7 Consultant shall obtain all types of necessary clearances, with the help of the Authority, required for implementation of the project on the ground from the concerned agencies. The Authority shall provide the necessary supporting official correspondences in this respect, while any official fees as per the demand note issued by such concerned agencies from whom the clearances are being sought to enable implementation, shall be borne by the Consultant. In case Consultant does not obtain all the necessary clearances upto the completion of the assignment, deduction upto 5% amount will be made from the final payment. The amount thus deducted will be released after all necessary clearances have been obtained.

3. Scope of Services

3.1 The general scope of services shall comprise

- (i) Review of all available reports and detailed conditions survey of existing roads and bridges
- (ii) Preliminary Survey & Alignment Option Study
- (iii) Traffic surveys and demand assessment
- (iv) Engineering surveys and geotechnical investigations
- (v) Location and layout of toll plazas (if any)
- (vi) Location and layout of truck lay byes and other wayside amenities.
- (vii) Location and layout of bus bays and bus shelters.
- (viii) Social impact assessment
- (ix) Environment impact assessment
- (x) Detailed Designs of road, bridges, structures, etc.
- (xi) Preparation of Land Plan Schedules including draft notifications and Utility Relocation Plans
- (xii) Preparation of BOQ / realistic & firm Cost Estimates along with suitable packaging with Flexible pavement / Rigid pavements.
- (xiii) Preparation of EPC Agreement Document including Schedules A to P.
- (xiv) To assist the Authority in obtaining formal approval/NOC from concerned authorities (viz. MOEF, State Government, Local bodies, NHAI etc.) for various elements of the project, during different phases of the Study.
- (xv) Additional requirement of survey as given in Supplement-I, II and III.
- (xvi) All Alternative mode of execution may be explored giving preference to BOT (Toll) mode and if traffic is not enough then for Hybrid Annuity mode in addition to EPC mode.
- (xvii) Pavement to be designed as rigid pavement as a default mode unless the cost is excessive high. For comparison purposes, cost may also be prepared based on Flexible pavement design.

- 3.2 The Consultant shall furnish land acquisition plans duly verified by the local revenue authorities including draft 3(a), 3A & 3D notification along with authenticated revenue records & maps for further processing of land acquisition. Consultant also submits land acquisition estimate duly certified by CALA to MoRT&H.

- 3.3 **The Consultant to integrate the other proposed development by Ministry /. This will include the ongoing works of widening of PWD, widening work already done by PWD.** In this connection Consultant will be provided a copy of Reports available for

suggesting overall improvement. The general scope of services is given in the sections that follow. However, the entire scope of services would, inter-alia, include the items mentioned in the Letter of Invitation and the TOR. The Consultant shall prepare documents for EPC contracts for the project.

- 3.4 *Wherever required, consultant will liaise with concerned authorities and arrange all clarifications. Consultant will also obtain 'NO Objection Certificate' from Ministry of Environment and Forest and also incorporate the estimates for shifting of utilities of all types involved from concerned local authorities in the DPR. Consultant is also required to prepare all Land Acquisition papers (i.e. all necessary schedule and draft 3a, 3A, 3D, 3G notification as per L.A. act) for acquisition of land either under NH Act or State Act.*
- 3.5 Consultant shall obtain all types of necessary clearances required for implementation of the project on the ground from the concerned agencies like MOEF, CWC, PWD / BRO other agency etc as per the requirement. The client shall provide the necessary supporting letters officially as per the demand note issued by such concerned agencies from whom the clearances are being sought to enable implementation. In case Consultant does not obtain all the necessary clearances upto the completion of the assignment, deduction upto 5% amount will be made from the final payment. The amount thus deducted will be released after all necessary clearances have been obtained.

4. TASKS

4.1 Primary Tasks

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

- i.** review of all available reports and published information about the project road and the project influence area;
- ii.** Environmental impact assessment.
- iii.** Public consultation, including consultation with Communities located along the road, NGOs working in the area, other stake-holders and relevant Govt. depts at all the different stages of assignment (such as inception stage, feasibility stage, and once final designs are concretized). Consultation with defence establishments etc in the region.
- iv.** detailed reconnaissance;
- v.** identification of possible improvements in the existing alignment and bypassing congested locations with alternatives, evaluation of different alternatives comparison on techno-economic and other considerations and recommendations regarding most appropriate option;
- vi.** traffic studies including traffic surveys and Axle load survey and demand forecasting for next thirty years;
- vii.** inventory and condition surveys for road;

- viii. inventory and condition surveys for bridges, cross-drainage structures and drainage provisions;
- ix. detailed topographic surveys using LIDAR technologies or similar technologies, Total Stations and GPS; The bidder has to mandatorily deploy LIDAR mounted vehicle, wherever technically and physically feasible for conducting detailed topographic surveys and may use a combination of conventional Total Stations along with, GPS
- x. pavement investigations;
- xi. 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;
- xii. identification of sources of construction materials;
- xiii. detailed design of road, its cross-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 other drawings and cross-drainage structures and underpasses etc.
- xiv. identification of the type and the design of intersections;
- xv. design of complete drainage system and disposal point for storm water
- xvi. value analysis / value engineering and project costing;
- xvii. economic and financial analyses;
- xviii. contract packaging and implementation schedule.
- xix. *“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 shifted / felled and planted and land acquisition requirements including schedule for LA: reports documents and drawings arrangement of estimates for shifting / cutting of trees and shifting of utilities from the concerned department .”*
- xx. *River training works and catchments area treatment plans.*
- xxi. *Preparation of Project Report, cost estimate, EPC schedules, Sub-estimation, miscellaneous drawings, rate analysis, detailed bill of quantities, bid documents for execution of civil works through budgeting resources.*
- xxii. *Design of weighing stations, parking areas and rest areas.*
- xxiii. *Any other user oriented facility enroute.*
- xxiv. *Tie-in of on-going/sanctioned works of MORT&H/ BRO/ other agencies.*
- xxv. *identification of black spots on project highway and preparation of mitigation plan.*

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 *The consultant shall study the possible locations, wayside amenities required and arboriculture along the highway shall also be planned.*

4.4 *Consultation and incorporation of measures suggested by State & Central disaster management bodies. Special emphasis shall be given for incorporation of mitigation measures in case of any disaster resulting due to adverse climatic condition, earth quake etc.*

4.5 ***Quality Assurance Plan (QAP)***

1. The Consultants should have detailed Quality Assurance Plan (QAP) for all field studies including topographic surveys, traffic surveys, engineering surveys and investigations, design and documentation activities. The quality assurance plans/procedures for different field studies, engineering surveys and 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 tractability 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 detailed Draft QAP Document must be discussed and finalized with the Authority immediately upon the award of the Contract and submitted as part of the inception report.

4.6 ***Reconnaissance Survey & Alignment Option Study***

4.6.1 The Consultants should make an in-depth study of the available land width (ROW) topographic maps / satellite imageries (50 cm High Resolution Stereo Satellite Imagery from World View 2 Satellite)/ air photographs of the project area and other available relevant information collected by them concerning the existing alignment. Consultant himself has to arrange the required authenticated revenue maps and the information needed by him from the potential sources. Consultant should make efforts for minimizing land acquisition. Modern survey techniques like LIDAR may be used for timely and accurate survey.

4.6.2 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).

4.6.3 The data derived from the reconnaissance surveys are normally utilised 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.

4.6.4 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 Alignment Option Study Report. The data obtained from the reconnaissance surveys should form the core of the database which would be supplemented and augmented using the data obtained from detailed field studies and investigations.

4.6.5 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 the Authority's comments. The data and the charts should also accompany the rationale for the selection of traffic survey stations.

4.6.6 Alignment Option Study:

- (a) Preparation of a DEM of the project zone from the data collected from Reconnaissance Survey.
- (b) Identification of alternative alignments for new road link projects, bye-passes etc. based on available secondary data and previous documents/records.
The alternative alignments should be selected in such a manner so that the probable cost of LA and other allied resettlement / rehabilitation can be minimized as far as practicable.
- (c) Processing of Reconnaissance survey data along each of the alternate alignments and preliminary assessment of project elements (length of embankment, number & spans of bridges / culverts / CD structures / ROB / RUB structures, bye-passes, Utility relocation / LA etc) and rough cost estimate for each alternate alignment.
- (d) Framing the decision matrix based on preliminary design, rough cost and/or other engineering / social / environmental aspects, and selection of the best suited alignment for the project thereof, in consultation with the Authority.
- (e) The selected alignment shall be further vetted by concerned bodies during the later course of this job if the alignment passes through their zone. The consultant shall assist the Authority in obtaining formal clearances from the said authorities.

4.6.7 Different feasible alignments for bypasses/realignment for congested locations/urban areas should be studied with due consideration to the feasibility/cost of land acquisition balancing the need for remedying the traffic congestion with the social and environmental impacts.

4.7 *Traffic surveys and demand assessment*

4.7.1 The types of traffic surveys and the minimum number of survey stations shall be as under:

Sl. No.	Description of Activity	Number of Survey Stations
1.	Classified Traffic Volume Count	One station each close to the proposed location of each Toll Plaza and one station for every 20 km of Project Highway. The stations are to be suitably chosen in order to assess the traffic volume through the highway stretch.
2.	Intersection Volume Count	All major intersections (All locations where the Project Highway intersects or meets a NH/SH/MDR).
3.	Pedestrian / Cattle crossing traffic	At all locations of settlements/habitations along the Project Highway
4.	Axle Load	At least 1 (one).
5	Origin - Destination & Commodity movement Survey	At least 2 (two) within the Project Influence Area.
6	Turning movement Survey	At every intersections with NH / SH.

The Consultant shall, upon award of the Consultancy, submit its proposal regarding the locations of traffic survey stations for each of the above activities along with an index plan giving the rationale of its proposal. Care shall be taken in proposing the locations in a manner that they capture the traffic in different sections. This proposal shall form part of the Inception Report. The Authority may, within one week of receiving the Inception Report, modify the locations of traffic survey stations in accordance with the provisions of this TOR and the Consultant shall comply with the same.

4.7.2 **Classified traffic volume count**

For conducting the traffic volume count, the Consultant shall comply with the following:

- (a) The classified traffic volume counts shall be carried out twice for 7 continuous days at the selected survey stations as per IRC guidelines on the subject (IRC:9-1972). The timing for such counts shall be
 - (i) within five weeks of the commencement of services, and
 - (ii) during the thirteenth week of commencement of services.

The following classes of vehicles shall be captured separately

Motorised vehicles		Non-motorised vehicles	
1	Cars (including Jeeps, vans)	1	Bicycles
2	Light Commercial Vehicles including Mini-busses	2	Cycle Rickshaws
3	Buses	3	Animal Drawn Carts
4	Two-Axle trucks	4	Hand carts
5	Three Axle trucks	5	Any other non-motorised vehicle.
6	Four or more axle trucks		
7	Tractors		

8	Ambulance, Fire tender, funeral vans		
9	Three wheelers		
10	Two wheelers		

- (b) The traffic count data would be analysed to depict hourly and daily variations. The Abstract of traffic data would also be provided for each survey station.

4.7.3 Intersection volume count and design

(a) Volume count

For conducting the intersection volume count, the turning movement traffic surveys shall be carried out as per IRC:SP:41-1994 at all locations where the Project Highway intersects/meets the NH, SH or MDR. The turning movement surveys will be undertaken from 08:00 to 12:00 hours in the morning and 16:00 to 20:00 hours in the evening.

(b) Design

- (i) The data at each location shall be presented and analysed to identify suitable treatment viz. at-grade intersection, grade separator without ramps or interchange with ramps in the light of warrants and criteria specified in the Manual. The type and layout proposed by the Consultant for each location shall be furnished along with the analysis supporting the same. Where an interchange with ramp is indicated by the analysis, its type should be determined keeping in view the site conditions.
- (ii) The amount of additional land required, if any, at each of the intersection on the Project Highway shall be clearly stated and brought out.
- (iii) For all cases where grade separators without ramps or interchanges with ramps are proposed, the possibility of their provision on the Project Highway in a phased manner shall be duly examined and a report on the cost- effectiveness of the Consultant's proposal submitted for consideration of the Authority to enable it to specify such requirements in the relevant Schedules of the EPC Agreement.

4.7.4 Pedestrian / Cattle crossing demand assessment

For assessing the requirements of Pedestrian/Cattle crossings, the traffic counts for two continuous days between 08.00 hours and 20.00 hours shall be carried out at the locations close to all habitations/settlements along the Project Highway. The data so collected shall be analysed to determine whether any pedestrian/cattle crossing by way of underpass/ overpass is justified. If so, the locations and broad layout shall be proposed.

4.7.5 Axle load spectrum surveys

Axle load spectrum surveys shall be carried out at each proposed location of toll plaza on the Project Highway. The axle load survey shall capture buses, trucks and tractors with trailers in the traffic stream. The survey shall be for both directions. Sample size shall not be less than 10% of the buses, trucks and tractors with trailers in the traffic stream and based on standard statistical techniques. The vehicle damage factor shall be calculated as per the equivalency factors given in IRC: 37.

4.7.6 Origin-Destination and Commodity Movements Surveys

The survey should be carried out simultaneously at the selected locations during the peak and the normal periods and should normally be conducted for seven consecutive days but in any case

for not less than three days and must include the weekly market day (if any) and one working day.

- (1) The Consultants shall carry out O-D and Commodity Movement Surveys at locations finalised in consultation with Authority. 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 locations of the O-D survey and Commodity Movement surveys shall normally be same as for the classified traffic count stations, other than in urban and semi urban areas.
- (2) The location zones shall of origin and destination 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 analysed 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 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.

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

4.7.8 Traffic demand assessment

- (a) The Consultant shall make an assessment of the traffic demand for the Project Highway for a period of 10 years, 15 years and 20 years respectively based on

analysis of traffic counts, trend growth and growth in the influence area of the Project Highway. Normally, an annual growth rate of 5% (five per cent) shall be assumed. Any variation would have to be justified with reasons, including analysis of past trends.

- (b) Based on the assessment of the traffic demand on the various sections of the Project Highway, the Consultant shall also provide a broad assessment of the year in which four-laning or further augmentation of lane configuration may be required within a period of 20 years. The Consultant shall also provide sensitivity analysis due to change in assumption of traffic projections.

4.8 *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. The detailed field surveys shall be carried out using high precision instruments like ATS, GPS (Differential Static & RTK mode), Digital Level, LIDAR etc. The data from the topographic surveys shall be available in (PNEZD) format for use in accurate digital terrain model (DTM). The Consultants would be fully responsible for any inaccuracy in surveys.
3. The detailed field surveys would essentially include the following activities:
 - i. *Topographic Surveys : Running a closed Traverse with DGPS along the existing road /proposed realignments, wherever required, and fixation of all cardinal points such as horizontal intersection points (HIP's), centre points and transit points etc. and properly referencing the same with a pair of reference pillars fixed on either side of the centre-line at safe places within the proposed survey corridor.*
 - ii. *Collection of details for all features such as structures (bridges, cross-drainage works, retaining walls, breast walls, crash barriers etc.) utilities, existing roads, electric and telephone installations (both O/H as well as underground), huts, buildings, fencing and trees (with girth greater than 0.3 metre) oil and gas lines etc. falling within the extent of survey.*
4. The width of survey corridor will generally be as given under:
 - i. *The width of the survey corridor should taken 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 carriageway. Normally the surveys should extend a minimum of 50 m on either side of the proposed alignment or land boundary, whichever is more. In cases of land slide locations, entire land slide zone shall be covered irrespective of NH boundary.*
 - 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 the Authority. 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 of 200m either side of the road centre line and will be of sufficient width to allow improvements, including at grade intersection to be designed.*
5. 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 45 cm 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 upto a depth of 30 cm with CC M10 (5 cm wide all around). The balance 15 cm above ground shall be painted yellow. The spacing shall be 100m 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 of 250 metres on Bench mark pillar made of RCC as mentioned above with RL and BM No. marked on it with red paint.*

4.8.1. 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 25 m interval, at the locations of curve points, small streams, intersections and at the locations of change in elevation.*
- ii. Cross sections at every 50 m interval in 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 as per recommendations **contained in IRC Special Publication No. 13 (Guidelines for the Design of Small Bridges and Culverts)** and IRC:5-1998 (“Standard Specifications & Code of Practice for Road Bridges, Section 1 - General Features of Design”).*

4.8.2. 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. 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/coordination with the concerned agency.

4.9 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.

4.9.1 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; and,*
 - 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*
 - xvii. *Inventory of all road sides facilities for the public including educational, health, communication facilities and road user based facilities such as tea shops, dhaba, vehicle service shops etc*
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.

4.9.2 Pavement Investigation

1. Pavement Composition

- i. *The data concerning the pavement composition may be already available with the PWD. 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

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

Shoulder

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

Embankment

- 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 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

- General condition*
- Connectivity of drainage turnouts into the natural topography*
- Condition in cut sections*
- Condition at high embankments*
- Local(village/local area level)drainage and flooding problem*

The data obtained from the condition surveys should be analysed 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 IRC 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 two-lane 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 the Authority 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, 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 the Authority. The sources of such methods should be properly referenced.

4.9.3 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. 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 subgrade soil shall be @5 km 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. *characterisation (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 Authority after the problematic soil types are identified along the road sections.
5. The laboratory for testing of material should be got approved from MORT&H before start of work.

4.10 Investigations for Bridges and Structure

4.10.1 Inventory of Bridges, Culverts and Structures

The Consultants shall make an inventory of all the structures (bridges, viaducts, ROB, culverts, etc.) along the road under the project. The inventory for the bridges, viaducts and ROB shall include the parameters required as per the guidelines of IRC-SP:35-1990. The inventory of culverts shall be presented in a tabular form covering relevant physical and hydraulic parameters.

4.10.2 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:5-1998 (“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 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 augmented by a reconnaissance along the area. All important hydrological features shall be noted during this field reconnaissance.

3. The Consultants shall collect information on high flood level (HFL), low water levels (LWL), 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.

4.10.3 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 proforma of IRC-SP; 35-1990. 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 the Authority for limited duration say 12 hrs. 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 Soil, geotechnical, material, hydrology and drainage surveys

The activities and Deliverables forming part of the soil, geotechnical, material, hydrology and drainage surveys are described below:

(a) The characteristics of the existing soil, **two samples from every km** of the Project Highway or closer where change in soil type is encountered.

(b) The determination of the following sub-grade properties **one sample from every km** of the Project Highway or closer where change in soil type is encountered.

- CBR (Soaked)
- In-situ density & Moisture Content
- Grain Size Distribution & Atterbergs Limits.

- Laboratory Moisture-density Characteristics.

(c) **Benkleman Beam Deflection measurements** on the Project Highway – one set of ten readings in 250 m for every three km of the Project Highway. **Condition of existing road may be brought out through test pits and material test wherever applicable in addition to/ in lieu of BBD tests.**

(d) **Investigations of the subsoil strata:**

The Consultants shall carry out geo-technical investigations and sub-surface explorations for the proposed Bridges / ROB / RUB / 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 in order to arrive at a realistic and firm cost-estimate for the project. The minimum scope of geo-technical investigations for bridge and structures shall be as under:

Sl. No.	Description of structure	Location of Boring
1.	Overall length of structure less than 30m	Both Abutment locations.
2.	Structure length between 30 – 60m	Both abutment locations and at least one intermediate location between abutment for structures having more than one span.
3.	Overall length of structure above 60m.	Each abutment & at each pier location.

- i) 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 finalise the bore hole locations in consultation with the Authority.
- ii) Sub-soil investigations will be done as per IRC 78 and other relevant IRC / IS Specifications.
- iii) The scheme for the boring locations and the depth of boring shall be prepared by the Consultants and submitted to Authority for approval. These may be finalised in consultation with Authority
- iv) The sub-soil exploration and testing should be carried out through the Geotechnical Consultants who have done Geo-technical investigation work in similar projects. In case of outsourcing Geo-Technical Investigation, the firm selected by the Consultant for this purpose should also be got approved from Authority before start of such works. The soil testing reports shall be in the format prescribed in relevant IRC / IS Codes.
- v) For the 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 5m below embankment base or to

refusal 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.

- (e) **Hydraulic data for bridges, design discharge, HFL, LWL, etc. with a view to checking adequacy of existing/proposed waterway.**
- (f) **An assessment of the General Drainage Condition, country flood Level, water table, seepage flow for design consideration of the Project Highway.**
- (g) **Material Investigations**
 - (i) 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.
 - (ii) 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.
 - (iii) 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.
 - (iv) The Consultants shall make suitable recommendations regarding making good the borrow and quarry areas after the exploitation of materials for construction of works.
 - (v) 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 designs

4.12.1 General:

The Consultant shall arrive at the detailed designs of various components of the Project Highway keeping in view the requirements of the Manual and the scope of services described in this TOR. It shall be responsible for the accuracy of the physical details such as alignment, right of way, abutting land use, assets within the right of way including safety devices, utilities, trees, service roads, cross drainage structures, etc. The layout and detailed designs shall be **prepared to enable ascertaining firm cost and bidding on EPC mode.**

4.12.2 The Consultants are to carryout detailed designs and prepare detailed drawings including

the following:

- (a) Geometric design of highway with appropriate level of service;
- (b) Design of pavement for the widening and rehabilitation for the existing road, paved shoulders, medians, verge (if applicable);
- (c) Bridges, underpass / overpass / cattle pass /subways and structures including ROB's etc.;
- (d) At-grade intersections;
- (e) ROB for railway crossings as per the requirement and the standards of the Indian Railways; and,
- (f) Alignment plans, longitudinal sections and cross-sections @ 50/25m intervals;
- (g) Designs for road furniture and road safety/traffic control features;
- (h) Designs and drawings for service road / tree planting/fencing at locations where necessary / required;
- (i) Drainage design showing location of turnouts, out falling structures, separate drawings sheet for each 5 km. stretch;
- (j) Rehabilitation and repair plan with for bridges and structures design and drawings;
- (k) Traffic amenities (Parking Areas, Weighing Station and Rest Areas, etc.);
- (l) Other safety features.

4.12.3 Wherever feasible within the constraints of the available / acquired land boundary, symmetrical widening of the existing carriageway / proposal of new alignment along the centre-line of ROW shall be avoided and the required widening / realignment shall be achieved in an eccentric fashion along the existing road / ROW.

4.12.4 Design Standards

The Consultants shall evolve Design Standards and material specifications for the Study primarily based on IRC publications, MORTH Circulars and relevant IS Specifications. 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.

4.12.5 Geometric Design

4.12.5.1 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 within the right of way.

4.12.5.2 The detailed design for geometric elements shall cover, but not be limited to the following major aspects:

- (i) *horizontal alignment;*
- (ii) *longitudinal profile;*
- (iii) *cross-sectional elements;*
- (iv) *junctions; and*
- (v) *Service roads.*

4.12.5.3 The alignment design shall be verified for available sight distances as per the standard norms. The provision of appropriate markings and signs shall be made

wherever the existing site conditions do not permit the adherence to the sight distance requirements as per the standard norms.

4.12.5.4 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.

4.12.5.5 In the case of closely spaced cross roads the Consultant shall examine different options to reduce conflicts 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.

4.12.5.6 The Consultant shall also prepare design of underpasses / subways for large cross traffic of pedestrians and / or animals.

4.12.5.7 The Consultant shall also prepare details for intersections taking into account the site conditions, turning movement characteristics, level of service, overall economy and operational safety.

4.12.6 Pavement Design

4.12.6.1 The detailed design of pavement shall involve:

(i) *strengthening of existing road pavement and design of the new pavement (shall consider both the flexible option or rigid option)*

(ii) *design of shoulders*

4.12.6.2 The design of pavement shall primarily be based on IRC Specifications. However, the Consultants may consult good industry practice wherever specific guidelines are unavailable in IRC or other relevant Indian Standards.

4.12.6.3 The design of pavement shall be rigorous and shall make use of the latest Indian and International practices. The design alternatives like rigid/flexible pavement and the most appropriate design option shall be established on life-cycle costing and techno-economic considerations.

4.12.6.4 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 flow charts indicating the various steps in the

design process, their interaction with one another and the input parameter required at each step.

4.12.6.5 For the design of overlays for the existing 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 include.

4.12.6.6 Latest techniques of pavement design and rehabilitation like provision of geosynthetics and cold/hot pavement recycling, use of modified bitumen etc. should be duly considered.

4.12.6.7 The pavement design task shall also cover working out the maintenance and strengthening requirements and periodicity and timing of such treatments. The maintenance requirements would be identified and evaluated for a period of 6-8 years after rehabilitation, together with the bill of quantities and the cost estimates and incorporated in the bid documents.

4.12.6.8 Surface and subsurface drainage problems of the existing road should be studied and remedial measures should be proposed adopting appropriate pavement options like rigid/flexible pavement along with surface and subsurface drainage measures for long term durability of the project highway.

4.12.7 Design of Embankments

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

4.12.7.2 The Consultants shall carry out detailed analysis and design for all embankments of height greater than 6 m based on relevant IRC publications.

4.12.7.3 *The design of embankments should include the requirements for protection works and traffic safety features.*

4.12.8 Design of Bridges and Structures

1. The data collected and investigation results shall be analysed 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.

4.12.8.1 The Consultant shall prepare General Arrangement Drawing (GAD) and Alignment Plan showing the salient features of the new 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 geotechnical studies, cost effectiveness and ease of construction. The GAD shall be supplemented with Preliminary designs. In respect of span arrangement and type of bridge a few alternatives with cost-benefit implications should be submitted to enable the Authority to approve the best alternative.

4.12.8.2 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, reconstruction or widening separately to the Client. The Consultant shall assist the Authority in pursuing the Indian Railways Authorities or/and any statutory authority of State/Central Government for approval of the GAD from concerned Authorities.

4.12.8.3 Subsequent to the approval of the GAD and Alignment Plan by the Authority and other State / Central Govt. agencies, the Consultant shall prepare detailed design as per IRC and other guidelines of Railways and/or other statutory authorities of State / Central Government and detailed drawings for all components of the bridges and structures required for its implementation under EPC mode of construction. The Consultant shall furnish the design and detailed drawings for suitable protection works and/or river training works wherever required.

4.12.8.4 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 GA drawings for carrying out the above improvements under EPC mode.

4.12.8.5 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.

4.12.8.6 Subsequent to the approval of the GAD and the alignment plan by the Authority and other statutory authorities of State / Central Government (as applicable), detailed design shall also be carried out for the proposed underpasses, overpasses and subways.

4.12.8.7 The Consultants shall also carry out the design and make suitable recommendations for protection works for bridges and drainage structures, wherever required / found inadequate.

4.12.8.8 In case land available is not adequate for embankment slope, suitable design for RCC retaining wall shall be furnished. However, RE wall may also be considered depending upon techno-economic suitability.

4.12.9 Drainage System

4.12.9.1 The requirement of roadside drainage system and the integration of the same with proposed cross-drainage system shall be worked out for the entire length of the project road section.

4.12.9.2 In addition to the roadside drainage system, the Consultants shall design the special drainage provisions for sections with super-elevated carriageways, high embankments and for road segments passing through cuts. The drainage provisions shall also be worked out for road segments passing through urban areas.

4.12.9.3 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.

4.12.10 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.

4.12.11 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.

4.12.12 Toll Plaza

1. The Consultants shall identify the possible toll plaza location(s) based on the data

and information derived from the traffic studies and a study of the existing physical features including the availability of land. The location of the plaza should keep in view that the project road is to be developed as a partially access controlled highway facility and it is required to collect toll on rational basis from as much of the vehicular traffic as possible consistent with economy of collection and operations. The location of the toll plaza should be finalised in consultation with IAHE.

2. Toll Plaza shall be designed as per IRC 84

4.12.13 Bus Parking, Truck Lay-byes, Weighing Station, Parking Areas and Rest Areas

The consultant shall suggest suitable sites for Bus Parking, Truck Lay-byes weighing stations, parking areas and rest areas and prepare suitable separate designs in this regard. The common facilities like petrol pump, first-aid medical facilities, police office, restaurant, vehicle parking etc. should be included in the general layout for planning.

4.12.14 Miscellaneous Works

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

4.13 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, including the cost of environmental safeguards proposed based on Schedule of Rates for NH Works for the state of Bihar / 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 each 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.
3. The consultant shall prepare sub-estimates as per instruction given by the Authority. The different EPC schedules shall also be prepared by consultant.

4.14 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.*
 - vi. *Environment costs and benefits to project*
 - vii. *Distribution of road user benefits (especially savings in VOC and travel time value) among different road user(vehicle) groups*
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 for the different scenarios as given under:
- | | |
|-----------------------|--|
| <i>Scenario - I</i> | <i>Base Costs and Base Benefits</i> |
| <i>Scenario - II</i> | <i>Base Costs plus 15% and Base Benefits</i> |
| <i>Scenario - III</i> | <i>Base Costs and Base Benefits minus 15%</i> |
| <i>Scenario - IV</i> | <i>Base Costs plus 15% and Base Benefits minus 15%</i> |
- 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.

4.15 Environment Impact Assessment

4.15.1 Environment Impact Assessment and Management Plan

Objectives

The objectives of Environmental Impact Assessment are to improve decision making by identifying and assessing the potential environmental impacts, evaluating alternatives and designing appropriate mitigation, enhancement, management and monitoring measures to ensure that highway improvement options are environmentally sound and sustainable. The main objectives of the Environmental Management Plan are to detail cost effective measures for the protection and enhancement of environmental assets during construction and operation according to an agreed implementation schedule. The Environment Impact Assessment is to be carried out to ensure compliance with State (as relevant), GOI environmental guidelines and regulations. The analysis, studies and reporting requirements to be undertaken under these TOR must conform to these guidelines and regulations.

Scope of Work

1. The scope of work includes the following main tasks:

A : Environmental Screening and Scoping – Inception & Reconnaissance Stage

This process helps to define boundaries (spatial and temporal) of the EA, limitations and constraints, stakeholders consultations, determine significant, “hotspots”. Screening is to be carried out in parallel with the initial Economic, Engineering Analysis and includes:

- a) Assessment of potential impacts to ensure that environmental considerations are given adequate weight in the selection and design of proposed highway improvements;

- b) Information on existing environmental baseline conditions (based on desk review and field visits) such as congested and densely populated areas, sensitive /critical natural habitats i.e., national parks, wildlife reserves, sanctuaries, sacred groves, protected areas, forests, wetlands, tree cover, major rivers and waterways; cultural heritage sites of importance to people
- c) Valued environmental components and a screening criteria to help in the analysis of alternatives.
- d) Assessment of positive and negative impacts and proposals of cost-effective measures to enhance positive impacts and to avoid and / or mitigate negative impacts;
- e) Coordination of the environmental screening with the feasibility study, by integration of the environmental considerations and their associated costs, in the economic analysis. This should include identification and analysis of alternatives in-built into the recommendations for engineering improvements and sensitivity analysis.
- f) Application of National and State framework and relevant guidelines and policies.
- g) Plans of proposed road alignments, showing all attributes within the corridor of impact.

Output : *Environment Screening Report – Identified :hotspots” and proposals for mitigation, nature of major conflicts with proposed road improvements, with preliminary solutions, including those for exclusion, analysis of alternative alignments.*

B: Environmental Impact Assessment (EIA) – Draft PR Stage

The EIA work will be carried out in coordination with the technical team.

- The EIA will be carried out in compliance with various prevailing laws and regulations in the country and the reporting will be in conformity to the various guidelines and regulations of the GoI relevant to the project including; The Environmental Impact Assessment Notification, MOEF, 1994; and Environmental Guidelines for Rail/Road/Highway Projects, MOEF, 1989.

The consultant will furnish any relevant information required for obtaining clearance from various state and central government agencies such as:

- Assisting the client in the submission of application for the Clearance of Reserved Forests to the Forest Departments.
- Completion of forms and submission of No-objection Certificate (NoC) under the Water and Air Acts from the State Pollution Control Boards.
- Completion and submission of the MoEF questionnaire for Environmental Appraisal for the project.
- Assistance in presentation to the Wildlife Board of the MoEF in obtaining clearance for the section of the corridor passing through the Wildlife Reserves or Sanctuaries, etc., if any.
- Assistance in submission for any other clearance requirements with respect to the environmental components relevant to the project.

The Consultant will carry out the following as part of the EIA process:

(a) **Assess Baseline conditions to define characteristics of the existing natural environment including soil, water, air, noise, land use, cultural properties, flora, fauna, regional landscape, geology, seismicity, quarries; social environment including, tribals, and other vulnerable social groups, title holders and non-titleholders, land estimates, ownership patterns. Establish benchmarks from which project impact comparisons will be made. Assess the dimensions of the study area and relevant physical, biological, and socio-economic conditions, including any changes anticipated before the project commences. Assess proposed development activities within the project area which may or may not be directly connected to the project. Data should be relevant to decisions about project location, design, operation, or mitigatory and enhancement measures. The baseline environmental conditions will be based on primary and secondary data sources and surveys will cover information on :**

- Physical environment : geology; topography, soils; climate and meteorology; ambient air quality; noise quality; surface and ground-water hydrology; existing sources of air emissions; existing receiving water quality, etc.
- Biological environment: flora; fauna; rare or endangered species; sensitive habitats, including reserved forests, wildlife reserves and sanctuaries etc.
- Socio-cultural environment: population: land use: planned development activities, community structure; employment; distribution of income, goods and services; recreation; public health; cultural properties; and tribal people and their usufruct rights, common property resources, etc.
- Additional specialized surveys: such as bio-diversity assessment survey, or hydrological surveys, if required depending upon the context and complexity of the project setting.
- Strip Mapping (as described in section 10.4/5), which include detailed inventory of all trees on the existing and proposed RoW; common property resources along the road, facilities for public (including health, education, communication facilities, etc.)
- Inventory of valued eco-sensitive locations: Site visits and investigations shall be made and all the eco-sensitive locations shall be marked on the base maps to identify conflict points with preliminary designs. These shall be verified from authentic sources of information, such as from the revenue records, forest records, etc.
- Baseline Environmental Monitoring for adequate number of samples, as established on a sampling network, so as to provide a representative sample of the entire project corridor, and the different characteristics (Such as land use, or presence of sensitive receptors existing along the road)
- Additional samples should be collected for sensitive environmental/ecological receptors, if any, such as to analyze and predict the possible impacts to a degree and precision of acceptable professional standards.

(b) **Assessment of the policy, regulatory and administrative framework at the National and State level, applicable World Bank or other lending agency requirements within which the EA is to be carried out. Assess the environmental requirements of any financiers; Identify relevant international environmental agreements to which the country is a party Legislative and Regulatory Considerations; Assess the pertinent regulations and standards governing environmental quality; health and safety,**

protection of sensitive areas, protection of endangered species, land uses control, etc at national, regional and local levels.

- (c) **Assess potential impacts** on physical, natural environment, as per baseline identification; Predict and assess the project's likely positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts in quantitative terms; identify mitigation measures, and any residual negative impacts that cannot be mitigated; identify locations for environmental enhancement.
- Determine impacts as per survey on sensitive receptors: For each of the sensitive environmental/ecological receptors, identified during environmental screening (or during the baseline environmental surveys), carry out detailed investigations for the impacts likely from the project.
 - Determine impacts as per survey on urban settlements and villages: noise, vibration, vehicle emissions and dust; safety, non-motorized transport, encroachments, severance and access, etc.;
 - Determine impacts as per survey on agricultural areas: loss of top soil, embankment erosion, disturbance to surface water flows and to rice-fields and farms during construction; etc.;
 - Determine impacts as per survey on natural habitats and other sensitive areas: critical natural habitats (such as conservation areas, sanctuaries, sacred groves, etc.) and migration routes; "induced development"; historic, cultural and religious buildings and sites; archaeological sites and tourism areas, etc;
 - Determine impacts as per survey on areas of environmental degradation: measures such as landscaping, planting, tree-planting earthworks to re-establish and/or enhance the environmental quality of areas within the right-of-way (ROW) which have suffered degradation.
- (d) **Analysis of Alternatives – Systematically analyze criteria to include environment; technical/design, economic options; alignment alternatives within the existing ROW; bypasses; road configuration alternatives; other engineering alternatives; including the “with and without project” situation; and suitability under local conditions. For each of the alternatives, quantify the environmental impacts, and coordinate with the economic analysis.**
- (e) **Mitigation measures** – Identify feasible and cost effective measures to minimize negative and enhance positive environmental impacts through integration in the engineering design and construction practices (including labor welfare measures) for all stages of the project. Develop a mitigation plan, to form the basis for the Environmental Management Plan, including costs, institutional, training and monitoring requirements. Identify any additional actions taken to protect the biophysical and social environment, as well as individuals impacted adversely by a project through continued public involvement.
- (f) **Institutional Strengthening** – Carry out a capacity Assessment to identify training needs and propose a training plan. Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, provincial/regional, and national levels and recommend steps to strengthen or expand them so that the management and monitoring plans in the environmental assessment can be implemented. The recommendations may extend to new agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

- (g) **Public Consultation** :Carry out Public consultation and ensure participation as an integral part of the assignment. Document processes and outcomes, views of the people, issues raised and how they will or will not be addressed by the project. Consultation sessions will be carried out with different stakeholders groups at the local, regional and district levels, to incorporate the various environmental concerns and felt needs of the community in the project preparation and implementation.
- (h) **Environmental Management Plan** – Coordinate with engineering design; construction management; incorporate IRC and MORT&H specifications; develop proposals for mitigation and enhancement such as for road side landscaping / tree planting, cultural properties, ponds etc.; cost estimates; institutional arrangements for implementation; Monitoring & Evaluation plans. (see part C below for details)
- (i) **Recommendations for further studies** on environmental issues which should be undertaken during project implementation.

The EIA Report will follow the structure suggested ahead:

- *Executive summary.* Concisely discuss significant findings and recommended actions.
 - *Project Description:* Provide a brief description of the relevant components of the project and associated activities. Concisely describe the proposed project and its geographic, ecological, social, and temporal context. Indicate the need for any resettlement plan or indigenous peoples development plan. Includes a map showing the project site and the project's area of influence.
 - *Policy, legal, and administrative framework.*
 - *Baseline data*
 - *Potential Environmental Impacts:*
 - *Analysis of alternatives.*
 - *Mitigation measures*
 - *Institutional strengthening and training*
 - *Appendices:*
 - List of EA report prepares – individuals and organizations.
 - *References – written materials both published and unpublished, used in study preparation.*
 - Record of interagency and consultation meetings, including consultations for obtaining the informed views of the affected people and local nongovernmental organizations (NGOs). The record specifies any means other than consultations (e.g., surveys) that were used to obtain the views of affected groups and local NGOs.
 - Tables presenting the relevant data referred to or summarized in the main text.
 - List of associated reports (e.g, resettlement plan or indigenous people development plan).
- Output:** Environment Impact Assessment Report (to be completed before final design and draft EMP (to be finalized along with final designs).

C : Environmental Management Plan –Final PR Stage

The environmental management plan focuses on mitigation measures, enhancement plans, institutional strengthening / training, and monitoring. The emphasis on each of these areas depends on the needs in the specific project context, as identified by the EIA itself. This will be prepared as a self sufficient document, for the Contractor and is part of the Contractor's contract documents. The Consultant will identify and summarize all anticipated impacts (including those involving indigenous people or involuntary resettlement); provide technical details for each mitigation measure, together with designs, equipment descriptions, and operating procedures; estimate any potential environmental impacts of these measures' and provide linkage with any other mitigation plans (e.g., for involuntary resettlement, indigenous peoples, or cultural property) required for the project.

- *Mitigation measures:* Define appropriate mitigation and remediation measures; the specification and the bills of quantities of the various environmental design measures to enable the incorporation of the environmental provisions in the Contract Documents.
- *Enhancement plans:* Include detailed designs/ drawings including specifications and bills of quantities for identified enhancement of specific locations. These cases will also require a plan for maintenance of the assets created / enhanced, in consultation with the community.
- Develop an implementation schedule and supervision program with associated costs and contracting procedures for the execution of environmental mitigation and design works;
- *Environmental Monitoring Plan:* Prepare detailed arrangements for monitoring implementation of mitigating measures and the impacts of the project during construction and operation and for the evaluation of environmental measures financed under the project. Include an estimate of capital and operating costs and a description of other inputs (such as training and institutional strengthening) needed to carry it out. The plan will specify monitoring parameters, associated responsibilities, costs, and other necessary inputs (for example, training). In addition, the plan will specify what action should be taken and by whom in the event that the proposed mitigation measures fail, either partially or totally, to achieve the level of environmental protection expected. The plan will also include a list of environmental monitoring and evaluation parameters, and detailed specifications (methods, schedule, etc) for performance/compliance monitoring during construction, and evaluation of the effectiveness of the environmental management measures during operation stage of the project.

The EMP will be structured as follows:

- Brief project description, summary of critical issues and impacts.
- Identified impacts and corresponding mitigation measures proposed – pre-construction; construction and operation stages.
- Environmental Monitoring and Reporting Plan – performance indicators, air, water, and noise levels, tree survival rate, soil contamination or any other as identified.
- Specifications for environment enhancements works.
- Trees, shrubs for plantation or other landscape measures.
- Engineering details and appropriate reference to engineering drawings where necessary for : wells and hand pumps identified for re-location or enhancement; cultural properties re-

location; water bodies for enhancement; proposed truck parking lay byes; major and minor junctions identified for enhancements; landscape plans.

- Identified borrow areas, recommended quarry areas and proposed rehabilitation plans.
- Noise mitigation plans.
- Costs of mitigation
- Institutional responsibility for implementation and duration /time frame.
- Reference to contract documents. Coordination with Engineering in preparation of bids, contract documents.
- Bills of quantities to include EMP specifications.
- Budget.

D. Follow on Public Consultations

- The Consultant will carry out follow on public consultations at sensitive areas to disseminate the project design, EA and SA process followed, EMP, and RAPs with the people in the project districts.

Output:

- **Documents – EA, EMP, and the report on Follow on Consultations**
- **Disclosure – Disclosure of EA, EMP in the project districts and Bank’s PICs**

4.15.2 Various improvement options like four laning /two laning with paved shoulders/two laning should be studied with due to consideration to their environmental impacts. Different options for different sections should also be considered balancing traffic requirements and minimizing environmental impacts. Bypasses/realignments should be duly considered minimizing the environmental impacts due to the proposed improvements.

4.16 Social impact assessment

The Consultant shall undertake social impact assessment due to the improvements proposed on the Project Highway, especially the persons affected due to the Project and requiring resettlement and rehabilitation. The extant policies and guidelines of the government would be kept in view while undertaking the assessment. He shall prepare a plan for involuntary resettlement and land acquisition, which shall include the following:

- (a) Prepare in accordance with guidelines of the Government, a draft Resettlement and Land Acquisition Plan;
- (b) Prepare area specific social assessments to support development of a locally relevant approach to resettlement which provides benefits to people in the Project’s area of influence, which include socioeconomic conditions, social service infrastructure, and social institutions and organization, in accordance with the Government policies and guidelines;
- (c) These social assessments should include gender and local ethnic aspects;
- (d) Provide recommendations and action plan for the EPC Contractor to undertake, at the detailed design stage, a full census and inventory of lost assets (households, shops and agricultural and other lands, or access to current income-generating activities, including impacts caused by permanent or temporary acquisition) of affected people and a baseline socioeconomic survey of the affected population. Determine the scope and magnitude of likely resettlement and land acquisition effects, and list likely losses of households, agricultural lands, business and income opportunities, as well as affected communal assets and public buildings;

- (e) In consultation with local stakeholders, government and the Authority, develop an entitlement matrix, on the basis of the consultations, socio-economic surveys, and inventories of losses that will determine the amount of compensation in accordance with the guidelines and policies of the Government;
- (f) Prepare the plans with full stakeholder participation, including the Government and the Authority. Consult with affected persons and community-based organizations to ensure that all affected persons have been fully informed of their entitlements through the consultative processes initiated by the Government and the Authority. Ensure that communities and displaced persons understand the project, its impacts, and the responsibilities of the parties; and
- (g) Analyse and confirm the following aspects that will apply to land acquisition and resettlement in the project area: (i) laws and regulations, including local practices; (ii) budgetary processes for involuntary resettlement and land acquisition; (iii) schedules for these activities that are coordinated with the construction schedule; and (iv) administrative arrangements and requirements.

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 (Short term and Long term improvements 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.

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 MoRT&H.
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 MoRT&H.
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.*
 - viii. *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 for the different scenarios as given under:

<i>Scenario - I</i>	<i>Base Costs and Base Benefits</i>
<i>Scenario - II</i>	<i>Base Costs plus 15% and Base Benefits</i>
<i>Scenario - III</i>	<i>Base Costs and Base Benefits minus 15%</i>
<i>Scenario - IV</i>	<i>Base Costs plus 15% and Base Benefits minus 15%</i>

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 basis, therefore, the Consultant shall study the financial viability of the project.
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.

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. MORT&H 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 clients 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 authorised 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 MORT&H 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 MORT&H 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 MORT&H from time to time.

9. Reports to be submitted by the Consultant to MORT&H

- 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 four stages as brought out below. Preliminary design work should commence without waiting for feasibility study to be completed.

Stage 1: Inception Stage

Stage 2: Reconnaissance & Alignment Option Study Stage

Stage 3: Draft Project Report Stage

Stage 4: Final Project Report (PR)

9.3 Time schedule in respect of all such stages has been indicated in the next para. Consultant shall be required to complete, to the satisfaction of the client, 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 MORT&H

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 hard copies as mentioned in Enclosure-III. Consultant shall submit all other reports mentioned specifically in the preceding paras of the TOR.
1. 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.

10.1 STAGE 1: Inception Report

(A) Quality Assurance Plan (QAP) Document

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 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 field and design activities shall start after the QAP is approved by **the Authority**. The data formats proposed by the Consultants for use in field studies and investigations shall be submitted within 10 days after the commencement of services and got approved by **the Authority**.

(B) Inception Report (IR)

The report shall cover the following major aspects:

- i. Project appreciation;*
 - ii. Detailed methodology to meet the requirements of the TOR finalised in consultation with the MORT&H 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) finalised in consultation with the Authority;*
 - 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 **the Authority**.

STAGE 2: Reconnaissance & Alignment Option Study Stage

A. Alignment Option Study Report

- C.1 The Consultant shall prepare & submit 2(two) copies of preliminary report containing the following documents to the Authority for provisional acceptance:
- i) Index map, Location map and DEM of the project zone prepared from available study data (if any) / district maps and topo sheets / 50 cm High Resolution Stereo Satellite Imagery from World View 2 Satellite [Basic Stereo Imagery Panchromatic, Multispectral 4-band, or Bundle (pan + 4-band multispectral)] procured from N.R.S.C., Hyderabad, on behalf of the Authority, processed by LPS etc.
 - ii) Existing (if any) and Selected alternate alignments (at least 3)
 - iii) Reconnaissance Survey Report along each alternate alignment.
 - iv) Inventory report of existing alignment (if any).
 - v) Contemplation of various proposed elements (Bridges, Culverts, ROB/RUB, intersections etc.) along each alignment
 - vi) Land use pattern along each alignment.
 - vii) Rough Cost Estimate & preliminary Economic Analysis along each alignment.

- viii) Decision matrix indicating salient merits/demerits of each alignment.
 - ix) Recommendation for the best suited alignment
- C.2 The Consultant shall obtain a provisional acceptance from the Authority, regarding selection of the best suited alignment. The consultant shall subsequently assist the Authority with necessary report / drawings / documents for obtaining acceptance/NOC from other concerned agencies on the proposed best suited alignment.
- C.3 The consultant shall submit 10 copies of Draft Alignment Option Study Report, containing all data/documents as stated in Clause C.1 including the acceptance / NOC of other concerned agencies to the Authority for its final acceptance.
- C.4 Any comments / observation from the Authority on the draft Alignment Option Study Report shall be duly incorporated by the consultant and finalise the best suited alignment in consultation with the Authority.
- C.5 Consultant shall also submit the draft 3(a) notification duly signed by concerned revenue Authorities after finalization of the alignment.

Note: Cost of procurement of any data/ documents and necessary charges for obtaining NOC from various concerned agencies will be borne by the Consultant. Assistance, concerning official correspondence with the relevant offices and necessary permissions regarding collection of various documents related with the project will be provided by the Authority.

B. Traffic Survey & Traffic Demand Assessment Report

- B.1 After approval of the Inception Report cum QAP by the Authority, the consultant shall carry out traffic survey as per Clause 3.3 and prepare a report indicating the traffic demand and traffic growth scenario in future. Based on the data collected at site, the consultant shall propose immediate lane configuration (subject to a minimum of 2-lane with paved shoulder) and future lane augmentation plan. The corridor width for topographic survey shall also be fixed up from the above data.
- B.2 The consultant shall submit **4 (four) copies** of the Traffic Survey & Traffic Demand Assessment Report and obtain approval of the Authority on the immediate lane configuration and Topographical Survey Corridor width for the selected alignment.
- B.3 The consultant shall submit the same report with the Draft Project Report and Final Project Report as per manner & numbers as specified in subsequent sections of the TOR.

Stage-3: Draft Project Report Stage

1. The draft **PR** Submission shall consist of Main Report, Design Report, Materials Report, Engineering Report, Drainage Design Report, Economic and Financial Analysis Report, Environmental Impact Assessment Report including Resettlement Action Plan (RAP), bid Documents and Drawings.
2. **Land Acquisition Report**

The Land acquisition report shall be prepared and submitted. The report shall include detail schedules about acquisition of land holdings 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 **the Authority**. The land acquisition report shall be submitted in both Hind and English languages. The land acquisition report should be prepared in consultation with affected persons, non-governmental organisations 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. **Consultant shall submit the draft 3(A) notification along with the Draft PR Report**

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

Reports

- i. **Volume-I, Main Report:** *This report will present the project background, 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. 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 Report shall also include updated cost estimates and updated economic and financial analysis.*

The Environmental Impact Assessment (EIA) Report for each contract package shall be submitted separately as a part of the main report.

The basic data (including its summary) 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 road features and pavement composition while Part-II shall deal with the design of structures like bridges, tunnels and cross-drainage structures. The sub-soil exploration report including the complete details of boring done, analyses and interpretation of data and the selection of design parameters shall be included as an Appendix to the Design Report.*

The 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 subgrade soils. The information shall be presented in tabular as well as in graphical representations and schematic diagrams. The Report shall present soil profiles along the alignment.

The material Report should also clearly indicate the locations of areas with problematic soils. Recommendations concerning the improvement of such soils for use in the proposed construction works, such as stabilisation (cement, lime, mechanical) should be included in the Report.

- iv. *Volume - IV, Environmental Impact Assessment Report including Environmental Management Plan (EMP): The Report shall be prepared conforming to the Guidelines of the Government of India and State.*
- v. **Volume - V, Technical Specifications:** *The MORT&H's Technical Specifications for Road and Bridge works shall be followed for this study.*
- 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.*
- 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 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 drawings for the following:*
- a. *Location Map*
 - b. *Horizontal Alignment and Longitudinal Profile.*
 - c. *Cross-section @ 50m interval along the alignment within ROW*
 - d. *Typical Cross-Sections with details of pavement structure.*
 - e. *Drawings for individual Culverts and Cross-Drainage Structures.*
 - f. *Drawings for individual Bridges, tunnels and Structures.*
 - g. *Drawings for Improvement of At-Grade and Grade-Separated Intersections and Interchanges.*
 - h. *Drawings for Road Sign, Markings and other Facilities.*
 - i. *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 parking areas, weighing stations, bus bays, rest areas, if any.
- j. *Drawings for toll plaza, Bus Bays, Parking areas, Rest areas, weighing stations etc.*
All drawings will be prepared in A2 size sheets. The format for plan, cross-section and profile drawings shall be finalised in consultation with the concerned MORT&H 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, bus bays, parking areas etc.
- k. *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.*
- x. **Volume - X, Civil Work Contract Agreement:** *civil works contract agreements based on EPC mode of contracts shall be submitted.*
- xi. **Volume-XI, Project Clearances** – *All the necessary(project related) clearances (such as from MOEF, defense establishments, Irrigation Deptt. and any other concerned agencies) shall be obtained by the consultant and submitted to the Authority so that project implementation can straight away proceed without any hold up.*

STAGE: 4 FINAL PROJECT REPORT

The Final PR consisting of Main Report, Design Report, Drainage Design Report and Materials Report, **incorporating** all revisions deemed relevant following receipt of the comments from **the Authority** on the draft PR shall be submitted as per the schedule given in Enclosure-III.

The process of obtaining approval/clearances from other concerned Authorities may be carried out simultaneously to expedite the procedure. However, in case of refusal by any department in according the clearance, the consultant shall provide alternate solution for that stretch in consultation with the Authority.

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

The Final package-wise DPR consisting of Main Report, Design Report, Drainage Design Report and Materials Report, incorporating all revisions deemed relevant following receipt of the comments from MORT&H on the draft DPR shall be submitted as per the schedule given in Enclosure-III.

11. Interaction with Authority

1. During entire period of services, the Consultant shall interact continuously with the Authority and provide any clarification as regards methods being followed and carry out modification as suggested by the Authority. A programme of various activities shall be provided to the Authority and prior intimation shall be given to the Authority regarding start of key activities such as boring, survey etc. so that inspections of the Authority could be arranged in time.
2. The Authority and other Government officers may visit the site at any time, individually or collectively to acquaint themselves with the field investigation and survey works.
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 Authority. 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 Patna 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 value as per Clause 6.3 of the Conditions of the Contract.

After completion of services the final contract amount shall be worked out on the basis of inputs and services actually carried out and the payment shall be adjusted accordingly.

The payments shall be released through RO, Patna, MoRT&H

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 MORT&H 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, Test Pit (Pavement composition), Benkelman Beam Deflection, Material Investigation including test results for subgrade 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.
 - ii. **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.
 - iii. **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.
2. **Software**: The Consultant shall also hand-over to MORT&H Pen Drive/CD's containing any general software including the financial model which has been specifically developed for the project.

3. The Pen drive/DVD's/CD's should be properly indexed and a catalogue giving contents of all Pen Drive/DVD's/CD's and print-outs of the contents (data from field studies topographic data and drawings) should be handed over to MORT&H at the time of submission of the Final Report.

SUPPLEMENT I

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

S.No.	Clause No. of TOR	<i>Additional points</i>
1.	2.3	<ul style="list-style-type: none"> 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
2.	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 and by provision of structures.
3.	4.1	<ul style="list-style-type: none"> 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.
4.	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.
5.	4.7	<p>Review of data and documents pertaining to</p> <ul style="list-style-type: none"> 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
6.	4.11(1)	The Consultant should make an indepth study of available geological and meteorological maps of the area.
7.	4.11 (2)	<p>The primary tasks to be accomplished during the reconnaissance survey shall also include:</p> <ul style="list-style-type: none"> 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 land slides, rock fall, snow drifts, erosion, avalanche activity etc.
8.	4.11.2.1 (ii)	Cross sections shall be taken at every 25 mtr. in case of hill roads and at points of appreciable changes in soil conditions. While taking cross sections, soil conditions shall also be recorded.
9.	4.11.3.1 (1)	The inventory data shall also include:

		<p>a) General elevation of road indicating maximum & minimum heights negotiated by main ascents & descents and total no. of ascents & descents.</p> <p>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.</p> <p>c) Details of tunnels</p> <p>d) Details & types of protective structures, erosion & land slide control/protection measures, snow drift control measures, avalanche protection/control measures etc.</p>
10.	4.11.3.2 (2)	<p>Pavement:</p> <p>a) Location of crust failures along with their causes</p> <p>b) Conditions of camber/cross falls/super elevations etc., whether affected by subsidence</p> <p>Embankment:</p> <p>Extent of slope erosion on hill and valley side</p>
11.	--	<p>Condition Surveys & Investigation for Slope Stabilization, Erosion Control, Landslide Correction/Protection & Avalanche Protection Measures:</p> <p>a) Inventory & Condition Surveys of Existing Protective/Control Measures:</p> <p>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.</p> <p>b) Landslide Investigation</p> <p>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.</p> <p>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/geo-technical/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.</p>
12.	4.12.1 (1)	<p>The Consultant shall also carry out detailed designs and prepare working designs for the following:</p> <p>a) cross sections at every 25 mtr intervals</p> <p>b) Slope stabilization and erosion control measures</p> <p>c) Design of protection/control structures in areas subject to subsidence, landslides, rock fall, rock slide, snow drifts, icing, scour, avalanche activity etc.</p> <p>d) Design of protective structures in slip prone and unstable areas</p> <p>e) Design of scenic overlooks, watering points etc.</p> <p>f) Safety features specific to hill roads</p>
13.	4.12.2 (1)	<p>The Consultant 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 (American, British etc) for hill roads.</p>
14.	4.12.3	<p>Wherever practicable/feasible hairpin bends and steep gradients shall be avoided by realignments, provision of structures or any other suitable provisions.</p>

15.	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.
16.	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.
17.	--	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/MORT&H and other international specifications.
18.	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.
19.	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.
20.	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.
21.	10.6 (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.
22.	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

SUPPLEMENT II

ADDITIONAL POINTS TO BE CONSIDERED FOR BRIDGES IN ADDITION TO POINTS COVERED IN MAIN TOR

For bridge packages, the main objective of the consultancy services is to establish the aesthetic, technical, economical and financial viability of the Project and prepare Detailed Project Reports for construction of 4 - lane bridge along with approach roads, at least about 2 km. length on each side of the bridge.

Siting of bridges, feasibility studies and project preparation shall be primarily carried out in accordance with IRC : 5 and IRC Manual for Project Preparation of bridges and other Codes and Specification and in consultation with respective Irrigation / Waterways Authorities.

For bridges requiring model study, the same shall be got done at a recognised Institution. The consultant will be responsible for identifying the Institution, supplying requisite data and coordinating the model study. The amount to be paid to the Institution shall be borne by the Employer.

S.No.	Clause No. of TOR	<i>Additional points</i>
1.	4.1	Primary Tasks The scope of services shall also cover the following : i. Inventory and condition surveys for existing river bank training/ protection works. ii. Detailed Design of approach roads (extending at least up to approximately 2 km an each side of the bridge). iii. Detailed Design of Bridge, cross drainage structures, underpasses& other structures as required. iv. Preparation of GAD, construction drawings etc. v. Strip plan for bridge and approach road. vi. Design discharge and scour depth vii. Detailed study of distress in the existing Bridge viii. Detailed Repair and Rehabilitation Program for the existing Bridge

2.	4.7	<p>Review of Data and Documents</p> <p>The data and documents of major interest shall also include the following:</p> <ul style="list-style-type: none"> a) Existing geological maps, catchment area maps, contour plans etc. for the project area b) Hydrological data, catchment area characteristics, river/channel characteristics, flood flow data and seismological data etc. c) Condition of existing river bank / protection works, if any. d) Sub surface and geotechnical data for existing near by bridges. e) Detailed drawings of nearby existing bridges.
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3.	4.11.1	<p>Reconnaissance and Alignment</p> <p>a) The consultant should make an in depth study of available geological maps, catchment area maps, contour plans, flood flow data and seismological data.</p> <p>b) The primary tasks to be accomplished during the reconnaissance surveys also include:</p> <p>i. Typical physical features along the approach roads</p> <p>ii. Possible bridge locations, land acquisition problems, nature of crossings, likely length of approaches and bridge, firmness of banks, suitability of alignment of approach roads</p>
4.	4.11.2	<p>Topographic surveys</p> <p>a) The detailed field surveys would essentially include the topographic surveys along the proposed location of bridge and alignment of approach road.</p> <p>b) The detailed topographic surveys should be carried out along the approach roads alignment and location of bridge approved by MORT&H.</p>
5.	4.11.2.1	<p>Longitudinal and Cross sections</p> <p>The topographic surveys for longitudinal and cross sections shall cover the following:</p> <p>Cross section of the channel at the site of proposed crossing and few cross sections at suitable distance both upstream and downstream, bed level upto 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.</p>

6.	4.11.4.2	<p>Hydraulic and Hydrological Investigations</p> <p>a) The consultant shall also collect information on observed maximum depth of scour.</p> <p>b) 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 augment 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.</p>
7.	4.11.4.4	<p>Geotechnical Investigations and Sub soil Exploration</p> <p>Investigation shall be carried out to determine the nature and properties of existing soil 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 soil, proneness of site to artesian conditions, seismic disturbance and other engineering properties of soil etc.</p>
8.	4.12.1	<p>General</p> <p>The consultants are also to carry out detailed designs and prepare working drawings for the followings ;</p> <p>a) Design of pavement for approach road</p> <p>b) Design of river bank protection / training works</p>

9.	4.12.6	<p>Design of Bridges and Structures</p> <p>The data collected and investigation results shall be analysed to determine the following :</p> <ul style="list-style-type: none"> 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.
10	3.1 (18)	<p>a) <i>Requirement of load testing of existing Bridge :- Consultant has to carry out the load testing of the existing Bridge including the other NDT required for assessment of quality of concrete and loss of pre-stress.</i></p>

SUPPLEMENT III

ADDITIONAL REQUIREMENT FOR SAFETY AUDIT

Checklists

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 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
A1 : General	<ul style="list-style-type: none"> ➤ Departures from standards ➤ Cross-sectional variation ➤ Drainage ➤ Climatic conditions ➤ Landscaping ➤ Services apparatus ➤ Lay-byes ➤ Footpaths ➤ Pedestrian crossings ➤ Access (minimize number of private accesses) ➤ Emergency vehicles ➤ Public Transport ➤ Future widening ➤ Staging of contracts ➤ Adjacent development
A2 : Local Alignment	<ul style="list-style-type: none"> ➤ Visibility ➤ New/Existing road interface ➤ Safety Aids on steep hills.
A3 : Junctions	<ul style="list-style-type: none"> ➤ Minimise potential conflicts ➤ Layout ➤ Visibility
A4 : Non-Motorised road users Provision	<ul style="list-style-type: none"> ➤ Adjacent land ➤ Pedestrians ➤ Cyclists ➤ Non-motorised vehicles
A5 : Signs and Lighting	<ul style="list-style-type: none"> ➤ Lighting ➤ Signs/Markings
A6 : Construction and Operation	<ul style="list-style-type: none"> ➤ Buildability ➤ Operational ➤ Network Management

Stage 1 – Completion of Preliminary Design

1. The audit team should review the proposed design from a road safety perspective and check the following aspects	
CONTENTS	ITEMS
Aspects to be checked	<p>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.</p> <p>B. Width options considered for various sections.</p> <p>C. Departures from standards and action taken.</p> <p>D. Provision of pedestrians, cyclists and intermediate transport</p> <p>E. Safety implications of the scheme beyond its physical limits i.e. how the scheme fits into its environs and road hierarchy</p>
B1 : General	<ul style="list-style-type: none"> ➤ Departures from standards ➤ Cross-sectional variation ➤ Drainage ➤ Climatic conditions ➤ Landscaping ➤ Services apparatus ➤ Lay-byes ➤ Footpaths ➤ Pedestrian crossings ➤ Access (minimize number of private accesses) ➤ Emergency vehicles ➤ Public Transport ➤ Future widening ➤ Staging of contracts ➤ Adjacent development
B2 : Local Alignment	<ul style="list-style-type: none"> ➤ Visibility ➤ New/Existing road interface ➤ Safety Aids on steep hills.
B3 : Junctions	<ul style="list-style-type: none"> ➤ Minimise potential conflicts ➤ Layout ➤ Visibility
B4 : Non-Motorised road users Provision	<ul style="list-style-type: none"> ➤ Adjacent land ➤ Pedestrians ➤ Cyclists ➤ Non-motorised vehicles
B5 : Signs and Lighting	<ul style="list-style-type: none"> ➤ Lighting ➤ Signs/Markings
B6 : Construction and Operation	<ul style="list-style-type: none"> ➤ 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	<p>A. Any design changes since Stage 1.</p> <p>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).</p>
C1 : General	<ul style="list-style-type: none"> ➤ Departures from standards ➤ Drainage ➤ Climatic conditions ➤ Landscaping ➤ Services apparatus ➤ Lay-byes ➤ Access ➤ Skid-resistance ➤ Agriculture ➤ Safety Fences ➤ Adjacent development
C2 : Local Alignment	<ul style="list-style-type: none"> ➤ Visibility ➤ New/Existing road interface
C3 : Junctions	<ul style="list-style-type: none"> ➤ Layout ➤ Visibility ➤ Signing ➤ Lighting ➤ Road Markings ➤ T,X,Y-junctions ➤ All roundabouts ➤ Traffic signals
C4 : Non-Motorised road users Provision	<ul style="list-style-type: none"> ➤ Adjacent land ➤ Pedestrians ➤ Cyclists ➤ Non-motorised vehicles
C5 : Signs and Lighting	<ul style="list-style-type: none"> ➤ Advanced direction signs ➤ Local traffic signs ➤ Variable message signs ➤ Other traffic signs ➤ Lighting
C6 : Construction and Operation	<ul style="list-style-type: none"> ➤ Buildability ➤ Operational ➤ Network Management

MANNING SCHEDULE

Sl.No	Key Personnel	Total Project Assignment (Eight months)		
		At site (mm)	At design office (mm)	Total Time Period (mm)
1	Sr. Highways Engineer-cum-Team Leader	4.00	4.00	8.00
2	Senior Bridge Engineer	3.0	3.00	6.00
3	Highway cum Pavement Engineer	3.00	3.00	6.00
4	Material-cum-Geo-technical Engineer	4	2.00	6.00
5	Senior Survey Engineer	4	2	6.00
6	Traffic and safety expert	1.5	1.5	3
7	Environmental Specialist	1.5	1.5	3
8	Quantity Surveyor/ Documentation Expert	2	5	7.0
	Total			45

Note: 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 IAHE 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.

3. The Consultant shall appoint a project Coordinator for effective Coordination of its services for the entire duration of the Project Assignment including pre construction activities until completion of the entire assignment of PMC Phase-I

Qualification and Experience Requirement of Key Personnel

Senior Highway Engineer-cum-Team Leader

i)	Educational Qualification	
	Essential	Graduate in Civil Engineering
	Desirable	Post Graduate in M. Tech in Highways Engineering / Traffic & Transportation Engineering
ii)	Essential Experience	
	a) Total Professional Experience	Min. 20 years
	b) Experience in Highway projects	Min. 15 years in Planning, project preparation and design of Highway Projects i.e. DPR preparation
	c) Experience in similar capacity	He should have worked as team Leader of at least 2 projects of 2/4/6-laning of 50 km equivalent length involving DPR preparation of NHs / SHs and he should also have carried out the DPR of at least one major Bridge of 200m length.
iii)	Age Limit	70 years on the date of submission of proposal

Senior Bridge Engineer

i)	Educational Qualification	
	a) Essential	Graduate in Civil Engineering
	Desirable	M. Tech in Structure Engineering
ii)	Essential Experience	
	a) Total Professional Experience	Minimum 15 years
	b) Experience in Bridge projects	Min. 10 years in project preparation and design of structure/bridge projects.
	c) Experience in Similar Capacity	Bridge Engineer in highway design consultancy projects (NH/SH/ Expressways) involving design of minimum two major bridges (length more than 200 m)
iii)	Age Limit	70years on the date of submission of proposal

Highway Cum Pavement Engineer

i)	Educational Qualification	
	Essential	Graduate in Civil Engineering
	Desirable	Post Graduated in Highway Engineering or Geo Tech & SMFE.
ii)	Essential Experience	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Highway Projects	Min. 15 years in Planning, project preparation and design of Highway projects, including 2/4/6laning / expressways. experience in pavement design and maintenance
	c) Experience in Similar Capacity	At least 2 projects of 2/4/6laning of 50kms involving DPR preparation of NH / SHs.
iii)	Age Limit	70 years on the date of submission of proposal

Material – cum – Geotechnical Engineer

i)	Educational Qualification	
	Essential	Graduate in Civil Engineering
	Desirable	M. Tech in Geotechnical / SMFE Engineering
ii)	Essential Experience	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Similar type of work in infrastructure projects	Min. 8 years on similar projects in design and/or construction
	c) Experience in Similar Capacity	At least 2 projects of 2/4/6laning of minimum 50km length equivalent and at least major Bridge projects of length of minimum 200m length.
iii)	Age Limit	70 years on the date of submission of proposal

Senior Survey Engineer

i)	Educational Qualification	
	Essential	Graduate in Civil Engineering or Diploma in Civil Engg or Diploma in Surveying
	Desirable	M. Tech in Surveying / Transportation
ii)	Essential Experience	
	a) Total Professional Experience	Min.15 years
	b) Experience in Highway 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	At least 2 projects of 2/4/6 laning of major highway projects (NH/SH/ Expressways) of length of minimum 50Km equivalent.
iii)	Age Limit	65 years on the date of submission of proposal

Traffic and Safety Expert

i)	Educational Qualification	
	Essential	Graduate in Civil Engineering
	Desirable	Masters in Traffic Engineering / Transportation Engineering / Transport Planning
ii)	Essential Experience	
	a) Total Professional Experience	Min. 10 years
	b) Experience in Highway projects	Min. 5 years on similar projects.
	c) Experience in similar capacity	Traffic Engineer in highway Projects (NH/SH/Expressways) involving 2/4/6 Laning of minimum aggregate length of 50 km.
iii)	Age Limit	70 years on the date of submission of Proposal

Environmental Specialist

i)	Educational Qualification	
	a) Essential	Graduate in Civil Engineering or Graduate in Environmental Engineering or Post Graduate in Environmental Sciences
	Desirable	M. Tech 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 infrastructure projects
	c) Experience in Similar Capacity	At least 2 projects of 2/4/6laning of major Highways projects (NH/SH/ Expressways) of length of minimum 50 km equivalent length.
iii)	Age Limit	70years on the date of submission of proposal

Quantity Surveyor/Documentation Expert

i)	Educational Qualification	
	Essential	Graduate in Civil Engineering / Certificate course from 'Institution of Quantity Surveying'
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 2/4 laning
	c) Experience in Similar Capacity	At least 2 projects of 2/4/6laning of major Highway projects (NH/SH/ Expressways) of length of minimum 50 km equivalent.
iii)	Age Limit	70 years on the date of submission of proposal

Enclosure-III

Schedule for Submission of Reports and Documents Submission Time w.e.f Date of Commencement of Consultancy Services (in days)

Sl. No	Activity	No. of copies	Time Period for assignment from date of commencement
1	Monthly Reports	3	Days
2	Inception Report (i) Inception Report including QAP Document (ii) Comments of the Authority (iii) Final Inception Report incorporating comments from Authority	06	10 15 20
3	Reconnaissance & Alignment Option Study Stage (i) Report by Consultant (ii) Comments of the Authority (ii) Final Report incorporating comments from Authority	06	45 60 70
4	Draft Project Report (i) Report by Consultant (ii) Comments of the Authority (ii) Final Report incorporating comments from Authority	06	150 170 180
5	FINAL PROJECT REPORT (i) Report by Consultant (ii) Comments of the Authority (ii) Final Report incorporating comments from Authority	10	210 230 240
	Project clearances from concerned agencies e.g. from MOEF; Irrigation Dept., Revenue Authorities for LA etc.	Original letters from the concerned agencies and 5 photocopies of each.	360

Note: Important documents like alignment plans, GADs with supporting calculation, details of junctions designs and details of any protection works, locations and proposals of C-D works etc., should be submitted to authority/Ministry intermittently without waiting for the submission stage, got reviewed and firmed up for timely and efficient completion of the consultancy assignment. Drawings, investigation reports and designs are to be signed by the concerned key personnel & Team leader with name designation date. All the raw data in original form collected through survey investigation should be preserved by the consultant for reference till the civil works construction is completed.

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, having examined all relevant documents and understood their contents, hereby submit our Proposal for selection as Consultant for [***** highway]. 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.

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 than 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. ***** (Rupees *****) 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.

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)

Form-E2/T3

FIRM'S REFERENCES

Relevant Services Carried out in the Last Seven 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:

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

Signature of Authorised Representative

(Certificate from Employer regarding experience should be furnished)

APPENDIX-II

Form- E3

Financial Capacity of the Applicant

Name of Applicant:

S.No.	Financial Year	Annual Revenue (Rs/US \$ in million)
1	2015-16	
2	2014-15	
3	2013-14	
4	2012-13	
5	2011-12	

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 the 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.

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

(Form-T1)

TECHNICAL PROPOSAL

FROM:

TO:

Sir:

Subject Consultancy Service for

Regarding Technical Proposal

I/We _____ 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)

(Form-T-2)

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

Sl.No.	<i>Name of Project</i>	Consultancy Package No.	Names of Proposed Key Personnel
1			
2			
3			
4			

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:

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

Signature of Authorised Representative

(Certificate from Employer regarding experience should be furnished)

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.

COMMENTS/ SUGGESTIONS OF CONSULTANT ON THE TERMS OF REFERENCE

1.

2.

3.

4.

5.

.....

.....

**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.			
....			
....			
....			

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 [not more than 2 pages] and analysis
 - 3) Quality Assurance system for consultancy assignment [not more than 1 page]
-

Details of Material Testing Facility

1. State whether the Applicant has in-house Material Testing Facility Yes/No

2. In case answer to 1 is Yes 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 No state arrangements made/proposed to be made for testing of materials

Facility for Field investigation and Testing

1. State whether the Applicant has in-house Facility for
 - a) Geo-technical investigation Yes/No
 - b) Pavement investigation Yes/No
 - c) Topographic Survey Yes/No

2. In case answer to 1 is Yes attach a list of field investigation and testing equipment available in-house

3. In case answer to 1 is No state arrangements made/proposed to be made for each of above Field investigation and testing

Office Equipment and software

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

Form- T11



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

Any other specific qualification

B) Experience
Total experience in highways: _____ Yrs
Responsibilities held :
ii) _____ Yrs.
_____ Yrs.
_____ Yrs.

iii) Relevant Experience : _____ Yrs.

C) Permanent Employment with the Firm (Yes/No):

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/NHAI/IAHE/State PWD 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 MORTH. I have also no objection if my services are extended by MORTH 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 /NHAI/IAHE/State PWD contracting firm (firm to be supervised now) for the ongoing projects. We understand that if the information about leaving the past assignment with MORT&H/NHAI/IAHE/ State PWD without completing his assignment is known to MORTH, MORTH would be at liberty to remove the personnel from the present assignment and debar him for an appropriate period to be decided by MORTH.

(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)

***The Financial proposal is to be filled strictly as per the format given in RFP.**

Format of Financial Proposal
Summary of Cost in Local and Foreign Currency (US \$)

No.	Description	Amount (LC)*(INR)	Amount (FC)* (US \$)
	Local Consultants		
I	Remuneration for Local Staff (inclusive of per diem allowance)		
II	Support Staff (inclusive of per diem allowance)		
III	Per diem allowance of expatriate personnel		
IV	Transportation cost for 2 no of vehicles (one Innova equivalent and one Indigo equivalent) for a monthly run of 2000km, Duty travel to site (for 20 trips), Site Office Rent with minimum area of 200 sqm, office supplies, utilities, communications, office furniture & equipment (only rental value), Reports& Documents as per TOR and its printing		
V	Surveys & Investigations		
A	Topographical Survey		
B	Investigations		
	Subtotal Local Consultants :		
	<u>Foreign Consultants</u>		
F-I	Remuneration of Expatriate Staff		
F-II	Mobilisation and Demobilisation		
	Total Cost Net of Tax		
	I. Income Tax (Expatriate)		
	II. Import duties		
	III. Value added tax		
	Total cost net of service tax**		
	Service Tax		
	Total Cost (Including Service Tax)		

LC* Local Currency

FC* Foreign Currency

** Total Cost Net of Service Tax 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.

Estimate of Local Currency Costs

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

S.No.	Position	Name	Rate (INR)	SM	Amt.(INR)
	Professional Staff				
1	Team Leader cum Senior Highway Engineer			8	
2	Senior Bridge Engineer			6	
3	Highway cum Pavement Engineer			6	
4	Material-cum-Geotechnical Engineer- Geologist			6	
5	Senior Survey Engineer			6	
6	Traffic and Safety Expert			3	
7	Environmental Specialist			3	
8	Quantity Surveyor/ Documentation Expert			7	
	Sub-Total:			45	
	Sub-Professional Staff	(45 man months to be distributed by Consultant as per requirement of assignment)			
1					
2					
3					
4					
5					
6					
7					
	Sub-Total:				
	TOTAL			90.0	

II. Support Staff

No.	Position	Name	Staff Months	Billing Rate()	Amount()
1	Office Manager	1	08		
2	Typist	1	08		
3	Office Boy	1	08		
4	Night Watchman	1	08		
				Total :	

III Per Diem Allowance of Expatriate Staff

S. No.	Key Personnel	Name	Total Time Period (MM)	Billing Rate (Rs.)	Amount (Rs.)

IV. Transportation cost for 2 no of vehicles (one Innova equivalent and one Indigo equivalent) for a monthly run of 2000km, Duty travel to site (for 20 trips), Site Office Rent with minimum area of 200 sqm, office supplies, utilities, communications, office furniture & equipment (only rental value), Reports& Documents as per TOR and its printing for a period of 08 months

Lump sum cost to be quoted for all the above items for full Project Duration

S. No	Description	Qty.	Amount
1	As described above in sl no IV	1	
	Total		

V. Survey and Investigation

A. Topographical Survey (Fixed Rate)

Item	Kms	Rate per Km (Rs.)	Amount (Rs.)
Topographic Survey including hire charges for equipment (LIDAR GPS, Total Station, Auto Level etc.,) and supply of survey Teams comprising of project survey filed staff etc. inclusive of cost of materials , labourer and construction of BM, (satellite imaginary, aerial photogrammetry if considered necessary) etc. complete. Please note that deployment of LIDAR mounted vehicle is mandatory	154		

B. Investigation (Fixed cost)

No.	Description	Quantity	Amount (Rs.)
1	Road and Bridge Inventory	L.S.	
2	BBD Test and Pavement Evaluation	L.S.	
3	Roughness Survey	L.S.	
4	Axle Load Survey	L.S.	
5	Material Survey and Investigation	L.S.	
6	Sub-grade Investigation	L.S.	
7	Traffic Survey	L.S.	
8.	Socio-economic & Census Survey/Studies	L.S.	
9.	Land Acquisition Studies	L.S.	
10.	Any other investigations/surveys	L.S	
11.	* Sub-Soil Investigation (Boring)	Rate	Qty
	a) Boring in all type of soils (other than hard rock)		2000 m
	b) Boring in hard rock		200 m
	Total		

Note: * Quantities of borings shall be taken from Financial Proposal Form No.V. For financial evaluation, these quantities and rates quoted by the consultant will be considered. However, Payment shall be made on the actual quantity of boring at rates quoted above by the Consultant which may be substantially more or less than the estimated quantities. Consultant shall get the actual length of boring approved from the employer before start of such investigation.

(Form-IV)

Estimate of Costs for Expatriate Consultants

I. Remuneration of Expatriate Staff including per diem allowances

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

II. Mobilization and Demobilization

1. International Airfares (Fixed costs)

Position	Round Trips	Rate	Amount
		Total	

II.2 Inland Travel in Home Country (Fixed Costs)

Lump Sum

2. **Other Miscellaneous expenses (like DA, internal travel expenses other incidentals)(fixed cost)**

TENTATIVE QUANTITIES FOR SUB-SOIL INVESTIGATIONS (BORING)

(Form –IV)

S. No	Stretch Proposed for DPR	Approximate Length (in Km.)	Package No.	State	Cumulative Tentative Quantities(in m)	
					In Soils other than hard rock	In hard rock
1	Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of (i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120 in Bihar on EPC Mode.	154 km	DPR/BI HAR/N HD-PAT/07	Bihar	2000	200

CONTRACT AGREEMENT

Between

**Ministry of Road Transport and Highways,
Govt. of India through Road Construction Department (NH)
Wing, Government of Bihar)**

and

“Consultant”

For

Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of shoulder of (i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120 in Bihar on EPC / PPP Mode

CONTENTS

Sl. No.	Description	Page No.
I.	CONTRACT FOR CONSULTANT'S SERVICES	
II.	GENERAL CONDITIONS OF CONTRACT	
1.	General Provisions	
1.1	Definitions	
1.2	Relation between the Parties	
1.3	Law Governing the Contract	
1.4	Language	
1.5	Headings	
1.6	Notices	
1.7	Location	
1.8	Authority of Member in Charge	
1.9	Authorized Representatives	
1.10	Taxes and Duties	
2.	Commencement, Completion, Modification and Termination of Contract	
2.1	Effectiveness of Contract	
2.2	Termination of Contract for Failure to Become Effective	
2.3	Commencement of Services	
2.4	Expiration of Contract	
2.5	Entire Agreement	
2.6	Modification	
2.7	Force Majeure	
2.7.1	Definition	
2.7.2	No Breach of Contract	
2.7.3	Measures to be Taken	
2.7.4	Extension of Time	
2.7.5	Payments	
2.7.6	Consultation	
2.8	Suspension	
2.9	Termination	
2.9.1	By the Client	
2.9.2	By the Consultants	
2.9.3	Cessation of Rights and Obligations	
2.9.4	Cessation of Services	
2.9.5	Payment upon Termination	
2.9.6	Disputes about Events of Termination	
3.	Obligations of the Consultants	
3.1	General	
3.1.1	Standard of Performance	
3.1.2	Law Governing Services	
3.2	Conflict of Interests	
3.2.1	Consultants not to Benefit from Commissions, discounts etc.	
3.2.2	Consultants and Affiliates not to be otherwise	

- interested in Project
 - 3.2.3 Prohibition of Conflicting Activities
 - 3.3 Confidentiality
 - 3.4 Liability of the Consultants
 - 3.5 Insurance to be taken out by the Consultants
 - 3.6 Accounting, Inspection and Auditing
 - 3.7 Consultants' Actions requiring Client's prior Approval
 - 3.8 Reporting Obligations
 - 3.9 Documents prepared by the Consultants to be the Property of the Client
 - 3.10 Equipment and Materials furnished by the Client
- 4. Consultants' Personnel**
 - 4.1 General
 - 4.2 Description of Personnel
 - 4.3 Approval of Personnel
 - 4.4 Working Hours, Overtime, Leave etc.
 - 4.5 Removal and/or Replacement of Personnel
 - 4.6 Resident Project Manager
- 5. Obligations of the Client**
 - 5.1 Assistance and Exemptions
 - 5.2 Access to Land
 - 5.3 Change in the Applicable Law
 - 5.4 Services, Facilities and Property of the Client
 - 5.5 Payment
- 6. Payment to the Consultants**
 - 6.1 Cost Estimates; Ceiling Amount
 - 6.2 Currency of Payment
 - 6.3 Mode of Billing and Payment
- 7. Responsibility for accuracy of the project document**
 - 7.1 General
 - 7.2 Retention money
 - 7.3 Penalty
 - 7.4 Action for deficiency in services
- 8. Fairness and Good Faith**
 - 8.1 Good Faith
 - 8.2 Operation of the Contract
- 9. SETTLEMENT OF DISPUTES**
 - 9.1 Amicable Settlement
 - 9.2 Dispute Settlement
- III. SPECIAL CONDITIONS OF CONTRACT**

IV. 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, 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: Format for Bank Guarantee for Performance Security
- Appendix J : Minutes of the Pre-bid meeting

CONTRACT FOR CONSULTANT'S SERVICES

MINISTRY OF ROAD TRANSPORT & HIGHWAYS

CONTRACT FOR CONSULTANTS' SERVICES

Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of **(i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120** in Bihar on EPC Mode.

This CONTRACT (hereinafter called the “Contract”) is made on the ----- day of the month of -----2016, between, on the one hand, -----(hereinafter called the “Client”) and, on the other hand,-----
---- (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, 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
(M/o Road Transport & Highways)

Witness

1. Signature
Name
Address

By
Authorised Representative

2. Signature
Name
Address

FOR AND ON BEHALF OF
(Consultant)

Witness
1. Signature
Name
Address

By
Authorised Representative

2. Signature
Name
Address

GENERAL CONDITIONS OF CONTRACT

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 laws and any other instruments having the force of law in the Government’s country as they may be issued 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 the Government;
- (e) “GC” means these General Conditions of Contract;
- (f) “Government” means the Government of India;
- (g) “local currency” means the currency of the Government;
- (h) “Member”, in case the Consultants consist of a joint venture of more than one entity, means any of these entities, and “Members” means all of these entities;
- (i) “Personnel” means persons hired by the Consultants or by any Subconsultant 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;
- (j) “Party” means the Client or the Consultants, as the case may be, and Parties means both of them;
- (k) “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;
- (l) “SC” means the Special Conditions of Contract by which these General Conditions of Contract may be amended or supplemented;
- (m) “Subconsultant” means any entity to which the Consultants subcontract any part of the Services in accordance with the provisions of Clause GC 3.7; and
- (n) “Third Party” means any person or entity other than the Government, the Client, the Consultants or a Subconsultant.

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 **Law Governing the Contract**

This Contract, its meaning and interpretation, and the relation between the Parties shall be governed by the Applicable Law.

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 **Heading**

The headings shall not limit, alter or affect the meaning 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, telex, telegram or facsimile 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, 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, 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 Subconsultants 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 hereunder.

(c) Force Majeure 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 fail to comply with any final decision reached as a result of arbitration proceedings pursuant to Clause 8 hereof;

- (d) 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;
- (e) 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
- (f) 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 (a) 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 final 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 hereunder 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 Subconsultants 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 Subconsultants, as well as the Personnel and agents of the Consultants and any Subconsultants, 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 Subconsultants, 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 Subconsultant and any entity affiliated with such Subconsultant, 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 Subconsultants 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 Subconsultants 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 Subconsultants to take out and maintain, at their (or the Subconsultants', as the case may be) own cost but on terms and conditions approved by the Client, insurance against the risks, and for the coverages, 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 therefor 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 Contract, 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 Subconsultant 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 Subconsultant 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 **Appendix A/E** 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 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, provided that any such increase shall not, except as otherwise agreed, cause payments under this Contract to exceed the ceilings set forth in Clause 6.1 (b) of this Contract.

4.3 Approval of Personnel

The Key Personnel and Subconsultants 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 service set forth in Appendix B. Any taking of leave by Personnel shall be subject to the prior 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**

- (a) During an assignment, if substitution is inevitable, the consultants shall forthwith provide as a replacement a person of equivalent or better qualifications.
- (b) 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 a replacement with qualifications and experience acceptable to him.
- (c) For the reason other than death/ extreme medical ground(i) for total replacement upto 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 termination/ debarment of such consultant for future projects of MORT&H for a period of 6 months to 24 months.
- (d) If the team leader or any other key personnel/ specialist considered pivotal to the project is replaced, the substitute may be interviewed by a committee formed by RCD (NH) Wing to assess their merit and suitability.
- (e) If any member of the approved team of a consultant engaged by RCD (NH) Wing leaves that consultant before completion of the job, he should 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 MORT&H projects.
- (f) In exceptional situations where the replacement with equivalent or better qualification is not available as mentioned in Sub-Para (a) & (b) above, 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 MORT&H / RCD (NH) Wing 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 MORT&H works for an appropriate period to be decided by MORT&H 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 MORT&H to black list 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, Subconsultants and Personnel with work permits and such other documents as shall be necessary to enable the Consultants, Subconsultants 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 Consultants 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 Subconsultants or the Personnel of 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 and subject to Clause 6.1(c), the payments under this Contract shall not exceed the ceiling specified in the SC. 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.	Description	Payment
1	On submission of final Stage – 1 Reports i.e Final Inception Report	15%
2	On submission of Final Alignment Report	10%
3	On the submission of Final Stage-2 Report i.e Reconnaissance & Alignment Option Study Stage including Final Alignment Report and Final Traffic Survey & Traffic Demand Assessment Report	05%
4	Submission of Final Land Acquisition Report i.e. Draft 3A notification and alignment marked on Authenticated Revenue Map and Social Impact Assessment Report	10%

S. No.	Description	Payment
5	Submission of clearance Proposal, i.e. online Submission of Forest clearance proposal as per FC Act, Online Submission of Proposal for Environmental Clearance if required, Online submission of GAD for ROB, Utility shifting estimate	5%
6	Submission of Draft DPR	10%
7	Approval of Final DPR	10%
8	Approval of technical schedules	5%
9	Publication of 3D notification	10%
10	Forest clearance / Wild Life clearance stage-I Approval	5%
11	Forest clearance / Wild Life clearance stage-II Approval (including approval of utility estimates by Agency and MoRT&H / Implementing Agency)	5%
12	Retention to be released after 3 years / completion of civil contract works whichever is earlier	10%
	Total	100%
13	Submission of draft 3A within one month of alignment finalization	2.5% bonus
14	Submission of Draft clearance proposals within one month of alignment finalization	2.5% bonus
<p><i>Note: 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 the Authority from time to time.</i></p>		

Payments shall be released through RO Patna.

(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 actuals 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 ninety (90) calendar days after receipt of the final report and final statement by the Client unless the Client, within such ninety (90) day period, gives written notice to the Consultants specifying in detail deficiencies in the Services, the final report or final statement. The Consultants shall thereupon promptly make any necessary corrections, and upon completion of such corrections, the foregoing process shall be 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 Authority 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 3 years whichever is earlier.

7.3. Penalty

7.3.1. Penalty for Error/Variation

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.

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.

7.4 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 MORT&H, other penal action including debarring for certain period may also be initiated as per policy of MORT&H.

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.

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”

1.4 The language is: **English**

1.6.1 The addresses are:

For the Authority : Chief Engineer (NH)
Road Construction Department
Govt of Bihar
Vishweshvaraiya Bhavan
Patna – 800001

Through

Executive Engineer
NH Division, Patna
Road Construction Department
Govt of Bihar
Rajbanshi Nagar
Patna – 800023

For the Consultants:

Attention:

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 telexes, 24 hours following confirmed transmission.
- (c) In the case of telegrams, 24 hours following confirmed transmission; and
- (d) In the case of facsimiles, 24 hours following confirmed transmission.

1.8 Entity to Act as Member in charge (In case of Joint Venture of Consultants):

- Not Applicable-

1.9 The Authorized Representatives are:

For the Authority : M/O RT&H through Chief Engineer (NH)

For the Consultant:

1.11 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 the MORT&H.
 - b) The consultant will furnish with in 15 days of the issue of letter of acceptance, a unconditional Bank Guarantee from the Bank (Generally, by SBI or its subsidiaries or any Indian nationalized bank or IDBI or ICICI or ICICI Bank or by a foreign bank through a correspondent bank in India) 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. The Bank Guarantee (**shall be extendable till the completion of civil contract works**) will be released by MORT&H upon successful completion of services and rectification of errors if any, found during implementation of services.
- 2.2 The time period shall be “four months” or such other time period as the parties may agree in 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 **08 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 coverages 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 Subconsultants 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 MORT&H / State RCD NH Wing 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 state in the contract.

v) If the Consultant enters into an agreement with MORT&H / RCD NH Wing in a joint venture or ‘in association’, the policy must be procured and provided to MORT&H/ RCD NH Wing 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 whereby the Consultant does not cancel the policy midterm without the consent of MORT&H / RCD NH Wing. 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 Senior Highway Engineer cum Team Leader 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 Service Tax)**

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) 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 therefrom, 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

Arbitration proceedings shall be conducted in accordance with procedure of the Arbitration & Conciliation Act 1996, of India unless the Consultant is a foreign national/firm, where arbitration proceedings shall be conducted in accordance with the rules of procedure for arbitration of the United Nations Commission on International Trade Law (UNCITRAL) as in force on the date of this Contract.

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 in DELHI
- (b) 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.]
- (c) 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.
- (d) 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 8,000/- per day subject to a maximum of Rs 2 lacs or Rs 1.5 lacs (lump sum) subject to publishing the award within 12 months.
2	Reading charges	Rs 6,000/-
3	Secretarial Assistance	Rs 5,000/-

4	Incidental charges (telephone, fax, postage etc)	Rs 6,000/-
5	Charges for publishing/ declaration of the award	Maximum of Rs 10,000/-
6	Other expenses (actual against bills subject to the prescribed ceiling)	Maximum ceiling
	Traveling expenses	Economy class (by air), First class AC (by train) and AC Car (by road)
	Lodging and Boarding	a) Rs 10,000/- per day (in metro cities) b) Rs 5,000/- per day (in other cities) c) Rs 2,000/- per day if any Arbitrator makes their own arrangements.
7	Local travel	Rs 10,000/- per day
8	Extra charges for days other than hearing/ meeting days (maximum for 2 days)	Rs 2,500/- per day

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-3), MORT&H before appointment of the Arbitrator,

Appendix A

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

Appendix B

Consultants' Subconsultants, Key Personnel and Sub Professional Personnel

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 Format for Bank Guarantee for Performance Security

BANK GUARANTEE FOR PERFORMANCE SECURITY

To

The Executive Engineer
NH Division, Patna
RCD, Bihar
Patna - Bihar

In consideration of “Ministry of Road Transport & Highways(MORT&H)” (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.....ourhaving 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 service tax for “Consultancy Services for Feasibility Study and Detailed Project Report for Improvement to Two Lane with Paved shoulder of (i) Stretch from Jahandabad on NH-22 – Ghosi – Hulasganj – Kkhudaganj – Rajgir on NH-120 & (ii) Stretch from the junction of NH-431 near Dhaniawan (Patna) – Islampur – Hulasganj – Khizr sarai – Gaya on NH-120 under Contract Package No. DPR/BIHAR/NHD-PAT/07 (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 towithout 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 includingand 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 Authorised 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).*

Appendix J :Reply to Queries of the Bidder