NATIONAL HIGHWAY AUTHORITY

Procurement & Contract Administration Section
28 Mauve Area, G-9/I, Islamabad ☎ 051-9032727, 🖷 051-9260419

No. 6(453)/DIR-III(P&CA)/NHA/18/02 4th January, 2018

Director General
Public Procurement Regulatory Authority
1st Floor FBC Building near State Bank,
Sector G-5/2, **Islamabad**

Subject: **ANNOUNCEMENT OF EVALUATION REPORT (PPRA Rule-35): Consultancy Services for Feasibility Study and Detailed Design for Improvement and Dualization of Existing Chichawatni – Lahore / Multan Motorway M-3 Link Road (44 Km).**

Reference: *PPRA Rule-35*

Kindly find attached the duly filled and signed Evaluation Report along with Bid Evaluation Criteria (Annex-I) pertaining to the procurement of subject services in view of above referred PPRA Rule-35 for uploading on PPRA website at the earliest, please.

(Muhammad Azam)
Director (P&CA)

Encl: Evaluation Report along with **Annex-I**

Copy for kind information to:

- Member (Engineering-Coord), NHA;
- Member (Planning), NHA;
- General Manager (P&CA), NHA;
- S.O. (Tech.) to Chairman, NHA.

EVALUATION REPORT
(As Per Rule 35 of PP Rules, 2004)

1.	Name of Procuring Agency:	National Highway Authority
2.	Method of Procurement:	Single Stage Two Envelope Procedure
3.	Title of Procurement:	Consultancy Services for Feasibility Study and Detailed Design for Improvement and Dualization of Existing Chichawatni – Lahore / Multan Motorway M-3 Link Road (44 Km).
4.	Tender Inquiry No.:	6(453)
5.	PPRA Ref. No. (TSE):	TS327916 E
6.	Date & Time of Bid Closing:	10th October, 2017 at 1130 hours local time
7.	Date & Time of Bid Opening:	10th October, 2017 at 1200 hours local time
8.	No of Bids Received:	Six (06) Proposals were received
9.	Criteria for Bid Evaluation:	Criteria of Bid Evaluation is attached at **Annex-I**
10.	Details of Bid(s) Evaluation:	As below

Name of Bidder	Marks		Evaluated Cost (PKR)	Rule/Regulation/SBD*/ Policy/ Basis for Rejection / Acceptance as per Rule 35 of PP Rules, 2004.
	Technical (if applicable)	Financial (if applicable)		
1) M/s Prime Engineering and Testing Consultants (Pvt.) Ltd. in JV with M/s Babar's Associates	614	200	12,663,025	Top scoring firm in combined evaluation (PPRA Rule 36(b) (ix))
2) M/s National Engineering Services Pakistan - NESPAK (Pvt.) Ltd. in JV with M/s TurkPak International (Pvt.) Ltd.	622	139	16,248,062	2nd
3) M/s Zeeruk International (Pvt.) Ltd. in JV with M/s CPM Engineering Consultants.	601	140	16,191,274	3rd
4) M/s Associated Consultancy Centre (Pvt.) Ltd. in JV with M/s Associated Consulting Engineers-ACE (Pvt.) Ltd. & M/s PAVRON	590	138	16,360,164	4th
5) M/s EA Consulting (Pvt.) Ltd. in JV with M/s JERS Engineering Consultants (JEC)	596	103	20,367,935	5th
6) M/s Asif Ali & Associates (Pvt.) Ltd. in JV with M/s A.A Associates & M/s Engineering Consultancy Services Punjab ECSP (Pvt.) Ltd.	542	Financial Proposal not opened		PPRA Rule 36(b) (v)

EVALUATION REPORT
(As Per Rule 35 of PP Rules, 2004)

Top Ranked Bidder: M/s Prime Engineering and Testing Consultants (Pvt.) Ltd. in JV with M/s Babar's Associates

11. **Any other additional / supporting information, the procuring agency may like to share**: The Procurement was carried out in line with PPRA Rules & Regulations. The bidding was done on QCBS method with 80:20 Technical to Financial Proposals ratio.

Signature: .....

Official Stamp: .....
General Manager (P&CA)
National Highway Authority
Islamabad

Standard Bidding Documents (SBD).

National Highway Authority

Annex-I

Criteria

FOR

Bid Evaluation

CONSULTANCY SERVICES
FOR
FEASIBILITY STUDY AND DETAILED DESIGN FOR IMPROVEMENT AND DUALIZATION OF EXISTING CHICHAWATNI – LAHORE / MULTAN MOTORWAY M-3 LINK ROAD (44 KM).

January, 2018

National Highway Authority

REQUEST FOR PROPOSAL

for

Consultancy Services
for
Feasibility Study and Detailed Design for Improvement and Dualization of Existing Chichawatni – Lahore/Multan Motorway M-3 Link Road (44 Km)

Tender No.6(453)

Pages (1 to 134)

September, 2017

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GOVERNMENT OF PAKISTAN
NATIONAL HIGHWAY AUTHORITY
27-Mauve Area, G-9/1,
Post Box No. 1205,
ISLAMABAD
Dated the _____
Ref No._____

LETTER OF INVITATION (LOI)

To,

All prospective consultants

Gentlemen!

We extend warm welcome to you and invite you for participating in this project. We hope that you will live up to your reputation and provide us accurate information so that the evaluation is carried out "just and transparent". Please understand that the contents of this RFP, where applicable, shall be deemed part of the contract agreement. An example to this affect can be the contents of your work plan and methodology which you shall be submitting in your technical proposal. Since that is the basis of the selection, therefore, it shall become part of the contract agreement subject to approval/revisions of the same by NHA during the negotiations. Similarly, all other services and the content contributing to services shall be deemed part of the contract agreement unless it is specified for any particular item up-front in your technical proposal which obviously will make your proposal a conditional proposal whereby, authorizing NHA to may or may not consider to evaluate your proposal. Please understand that if no such mention appears up-front (i.e. on front page of technical proposal) then it shall be deemed that the consultant is in 100% agreement to the above. You are also advised to kindly read the RFP thoroughly as it can drastically affect the price structure for various services which may not be appearing directly in the terms of reference. In the end, we appreciate your participation and hope that you will feed a good proposal to merit consideration by NHA.

General Manager (P&CA)
Telephone: +92-51-9032727,
Fax: +92-51-9260419
E-mail: gmpca.nha@gmail.com,
Website: www.nha.gov.pk

ATTACHMENTS

1. Instructions to Consultants (Annex A)
2. Data Sheet (Annex B)
3. Checklist for Completeness of Proposal
4. Summary Evaluation Sheet
4. Personnel Evaluation Sheet
5. Technical Proposal Forms
6. Financial Proposal Forms
7. Appendix A (Terms of Reference)
8. Appendix B (Person-Months and Activity Schedule)
9. Appendix C (Client's Requirements from the Consultants)
10. Appendix D (Personnel, Equipment, Facilities and other services to be provided by the Client).
11. Appendix E (Copy of Model Agreement)

Annex A

INSTRUCTIONS TO CONSULTANTS

1. INTRODUCTION

1.1 You are hereby invited to submit a technical and a financial proposal for consulting services required for the assignment named in the attached Data Sheet (referred to as "Data Sheet" hereafter) annexed with this letter. Your proposal could form the basis for future negotiations and ultimately a Contract between your firm and the Client named in the Data Sheet.

1.2 A brief description of the assignment and its objectives are given in the Data Sheet. Details are provided in the attached RFP for design services provided in the Documents, and will become part of agreement subsequently.

1.3 The assignment shall be implemented in accordance with the phasing specified in the Data Sheet.

1.4 The Client has been entrusted the duty to implement the Project as Executing Agency by Government of Pakistan (GoP) and funds for the project shall be arranged by the Client.

1.5 To obtain first-hand information on the assignment and on the local conditions, you are encouraged to pay a visit to the Client before submitting a proposal and attend a pre-proposal conference if specified in the Data Sheet. Your representative shall meet the named officials on the date and time specified in the Data Sheet. Please ensure that these officials are advised of the visit in advance to allow adequate time for them to make appropriate arrangements. You must fully inform yourself of local conditions and take them into account in preparing your proposal.

1.6 The Client shall provide the inputs specified in the Data Sheet, assist the Consultants in obtaining licenses and permits needed to carry out the services, and make available relevant project data and reports.

1.7 Please note that:

i. The cost of preparing the proposal and of negotiating the Contract, including a visit to the Client, are not reimbursable as a direct cost of the Assignment, and

ii. The Client is not bound to accept any of the proposals submitted.

1.8 The names of the invited consultants are given in the Data Sheet.

1.9 We wish to remind you that in order to avoid conflicts of interest:

National Highway Authority ★ Govt. of Pakistan ★

a) Any firm providing goods, works, or services with which you are affiliated or associated is not eligible to participate in bidding for any goods, works, or services (other than the services and any continuation thereof) resulting from or associated with the project of which this assignment forms a part; and

b) Any previous or ongoing participation in relation with the project by your firm, its professional staff, its affiliates or associates under a Contract may result in rejection of your proposal. You should clarify your situation in that respect with the Client before preparing the proposal.

2. DOCUMENTS

2.1 To prepare a proposal, please use the Documents specified in the Data Sheet.

2.2 Consultants requiring a clarification of the Documents must notify the Client, in writing, not later than twenty one (21) days before the proposal submission date. Any request for clarification in writing, or by cable, telex or tele-fax shall be sent to the Client's address specified in the Data Sheet. The Client shall respond by cable, telex or tele-fax to such requests and copies of the response shall be sent to all invited Consultants.

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 an invited consulting firm, modify the Documents by amendment. The amendment shall be sent in writing or by cable, telex or tele-fax to all invited consulting firms and will be binding on them. The Client may at its discretion extend the deadlines for the submission of proposals.

3. PREPARATION OF PROPOSAL

It will consist of two parts – Technical and Financial

3.1 Technical Proposal

3.1.1 The Technical Proposal should be submitted using the format specified and shall include duly signed and stamped forms appended with the RFP. This is a mandatory requirement for evaluation of proposals and needs to be filled up carefully.

3.1.2 For Technical Proposal, the general approach and methodology which you propose for carrying out the services covered in the TOR, including such detailed information as you deem relevant, together with your appreciation of the Project from provided details and

(a) A detailed overall work program to be provided with timing of the assignment of each expert or other staff member assigned to the project. This will also provide the Client an opportunity to effectively monitor work progress.

(b) Total number of man-months and project duration as per TOR.

(c) Clear description of the responsibilities of each expert staff member within the overall work program.

(d) The Curriculum Vitae (CV) of all Key Staff members and an affidavit that proposed staff shall be available for the assignment during the project duration and their present place of duty may also be specified. The Consultants are advised to suggest such names that shall be available for the Assignment.

(e) The technical proposal shall include duly filled in forms provided with this RFP. The name, background, and professional experience of each expert staff member to be assigned to the project, with particular reference to his experience of work of a nature similar to that of the proposed assignment.

(f) Current commitments and past performance are the basic criteria of technical proposal. You are required to provide the details of present commitments/on- going jobs as referred in the Form A-10 of technical proposal. Further, the basis for the past performance is the report from Design Section and Construction Wing of the Client.

3.1.3 In preparing the technical proposal, you are expected to examine all terms and instructions included in the Documents. Failure to provide all requested information shall be at your own risk and may result adversely in the scoring of your proposal. The proposal should be prepared as per RFP and any suggestion or review of staff etc. should be clearly spelt out in form A-4. This will be discussed at the time of negotiation meeting as and when called.

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

a. The Firm needs to be registered with Pakistan Engineering Council (PEC).

b. If you consider that your firm does not have all the expertise for the assignment you may obtain a full range of experience by associating with other firms or entities. You may also utilize the services of expatriate experts but only to the extent for which the requisite expertise is not available in any Pakistani firm. In case of Joint Venture, the proposal should state clearly partners will be "Jointly and Severally" responsible for performance under the Contract and one (Representative) partner will be responsible for all dealings with the Client on behalf of the Joint Venture. Its "Power of Attorney" on this account is to be enclosed. The representative partner shall retain the responsibility for the performance of obligations and satisfactory completion of the consultancy services. PEC registers a foreign consulting firm for issuing license to provide consultancy services in Pakistan, which is based on formation of JV with the condition that the foreign consulting firm shall provide only that share of consultancy services by the JV for which expertise is not available with Pakistani consulting firms. A copy of JV agreement to be provided at the time of finalizing the contract documents with specific responsibilities and assignments to be looked after by each partner.

c. Subcontracting part of the assignment to the other Consultants is not discouraged and Specialist Sub-Consultants may be included.

d. The key professional staff proposed shall be permanent employees of the firm unless otherwise specified in the Data Sheet. The minimum stay with the firm for such persons is Six months. No alternative to key professional staff may be proposed and only one CV may be submitted for each position. The minimum required experience of proposed Key Staff is specified in the Data Sheet.

e. The training shall be imparted during the currency of the contract if specified in the Data Sheet.

3.1.5 The technical proposal shall not include any financial information. The Consultant's comments, if any, on the data, services and facilities to be provided by the Client and specified in the TOR shall be included in the technical proposal.

3.2 Financial Proposal

3.2.1 The financial proposal should be submitted using the format specified and enclosed with this RFP. This is a mandatory requirement for evaluation of proposals and needs to be filled up carefully. The total cost is to be specified in the Form A-17 and accordingly also in Form A-11.

3.2.2 The financial proposal should list the costs associated with the Assignment. These normally cover remuneration for staff in the field and at headquarters, per diem, housing, transportation for mobilization and demobilization, services and equipment (vehicles, office equipment furniture and supplies), printing of documents, surveys and investigations. These costs should be broken into foreign (if applicable) and local costs. Your financial proposal should be prepared using the formats attached as forms A-11 to A-17.

3.2.3 The financial proposal shall also take into account the professional liability as provided under the relevant PEC Bye-Laws and cost of insurances specified in the Data Sheet.

3.2.4 Costs may be expressed in currency (s) listed in the Data Sheet.

3.2.5 The evaluation committee will correct any computational errors. When correcting computational errors, in case of discrepancy between a partial amount and the total amount, or between word and figures the formers will prevail. In addition to the above corrections, activities and items described in the Technical Proposals but not priced, in the Financial Proposals shall be assumed to be included in the prices of other activities or items. In case an activity or item is quantified in the Financial Proposal differently from the Technical Proposal, the evaluation committee shall correct the quantification specified in the Financial Proposal so as to make it consistent with that specified in the Technical Proposal.

4. SUBMISSION OF PROPOSALS

4.1 You shall submit one original technical proposal and one original financial proposal and the number of copies of each specified in the Data Sheet. Each proposal shall be in a separate

envelope indicating original or copy, as appropriate. All technical proposals shall be placed in an envelope clearly marked "Technical Proposal" and the financial proposals in the one marked "Financial Proposal". These two envelops, in turn, shall be sealed in an outer envelope bearing the address and information specified in the Data Sheet. The envelope shall be clearly marked, "DO NOT OPEN, EXCEPT IN PRESENCE OF THE EVALUATION COMMITTEE."

4.2 In the event of any discrepancy between the copies of the proposal, the original shall govern. The original and each copy of the technical and financial proposals shall be prepared in indelible ink and shall be signed by the authorized Consultant's representative. The representative's authorization shall be confirmed by a written power of attorney accompanying the proposals. All pages of the technical and financial proposals shall be initialed by the person or persons signing the proposal.

4.3 The proposal shall contain no interlineations or overwriting except as necessary to correct errors made by the Consultants themselves. Any such corrections shall be initialed by the person or persons signing the proposal.

4.4 The completed technical and financial proposals shall be delivered on or before the time, date, and the location specified in the Data Sheet.

4.5 The proposals shall be valid for the number of days stated in the Data Sheet from the date of its submission. During this period, you shall keep available the professional staff proposed for the assignment. The Client shall make its best effort to complete negotiations at the location stated in the Data Sheet within this period.

5. PROPOSAL EVALUATION

5.1 A Single-Stage-Two-Envelope procedures shall be adopted in ranking of the proposals. The technical evaluation shall be carried out first, followed by the financial evaluation. The Consultants shall be ranked using a combined technical/financial score.

5.2 Technical Proposal

5.2.1 The evaluation committee appointed by the Client shall carry out its evaluation for all the projects as listed in Para 1.1, applying the evaluation criteria and point system specified in the Data Sheet. Each responsive proposal shall be given a technical score: St. The Consultants scoring less than seventy (70) percent points shall be rejected and their financial proposals returned un-opened.

5.3 Financial Proposal

5.3.1 The financial proposals of the three top-ranking qualifying Consultants on the basis of evaluation of technical proposals shall be opened in the presence of the representatives of these Consultants, who shall be invited for the occasion and who care to attend. The Client

shall inform the date, time and address for opening of financial proposals as specified in the Data Sheet. The total cost and major components of each proposal shall be publicly announced to the attending representatives of the firms.

5.3.2 The evaluation committee shall determine whether the financial proposals are complete and without computational errors. The lowest financial proposal (Fm) among all shall be given a financial score: Sf of 1000 points. The financial scores of the proposals shall be computed as follows:

$$Sf = (1000 \times Fm)/F$$

(F = amount of specific financial proposal)

5.3.3 Proposals, in the Quality Cum Cost Based Selection (QCBS) shall finally be ranked according to their combined technical (St) and financial (S_f) scores using the weights (T- the weight given to the technical proposal, P = the weight given to the financial proposal, and T+P=1) stated in the Data Sheet:

$$S = St \times T\ \% + Sf \times P\%$$

6. NEGOTIATION

6.1 Prior to the expiration of proposal validity, the Client shall notify the successful Consultant who submitted the highest ranking proposal in writing, by registered letter, cable telex or facsimile and invite it to negotiate the Contract.

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

6.3 Negotiations shall commence with a discussion of your technical proposal. The proposed methodology, work plan, staffing and any suggestions you may have made to improve the TOR. Agreement shall then be reached on the final TOR, the staffing, and the bar charts, which shall indicate activities, staff, and periods in the field and in the home office, staff months. logistics and reporting.

6.4 Changes agreed upon shall then be reflected in the financial proposal, using proposed unit rates (no negotiation of the staff month rates).

6.5 Having selected Consultants on the basis of, among other things, an evaluation of proposed key professional staff, the Client expects to negotiate a contract on the basis of the staff named in the proposal. Prior to contract negotiations, the Client shall require assurances that the staff members will be actually available. The Client shall not consider substitutions of key staff except in cases of un-expected delays in the starting date or incapacity of key professional staff for reasons of health.

6.6 The negotiations shall be concluded with a review of the draft form of the contract. The Client and the Consultants shall finalize the contract to conclude negotiations. If negotiations fail, the Client shall invite the Consultants that received the second highest score in ranking to Contract negotiations. The procedure will continue with the third in case the negotiation process is not successful with the second ranked consultants.

7. AWARD OF CONTRACT

7.1 The contract shall be awarded after successful negotiations with the selected Consultants and approved by the competent authority. Upon successful completion of negotiations/initialing of the draft contract, the Client shall promptly inform the other Consultants that their proposals have not been selected.

7.2 The selected Consultant is expected to commence the assignment on the date and at the location specified in the Data Sheet.

8. CONFIRMATION OF RECEIPT

8.1 Please inform the Client by telex/facsimile courier or any other means:

(i) That you received the letter of invitation;
(ii) Whether you will submit a proposal; and
(iii) If you plan to submit a proposal, when and how you will transmit it.

Annex-B

DATA SHEET

LOI Clause No.	DESCRIPTION OF CLAUSE
1.1	The name of Assignment is:- Consultancy Services for **"Feasibility Study and Detailed Design for Improvement and Dualization of Existing Chichawatni – Lahore/ Multan Motorway M-3 Link Road (44 Km)"** The Client's Name is:- **National Highway Authority**
1.2	The description and the objectives of the assignment are: **As per TOR**
1.3	Phasing of the Assignment (if any): **Nil** The Consultant shall commence the assignment upon signing of Contract Agreement between NHA and the successful Consultant.
1.5	Pre-Proposal Conference: **Yes** ____√____ **No** _____ The name(s) and address(es) of the Official(s) is (are): **General Manager (P&CA)** National Highway Authority 28, Mauve Area, G-9/1 Islamabad Date, Time and Venue for Pre-proposal Conference: **Date: 21st September, 2017** **Time: 1100 hours** **Venue: NHA Auditorium (HQ)** National Highway Authority 28, Mauve Area, G-9/1 Islamabad.
1.6	The Client shall provide the following inputs: **As per TOR and Appendix D.**
1.7	Following sub-clauses are added: iii. The Consultant may please note not to suggest names of key staff already proposed in other proposals with the Client or awarded recently. This will affect adversely marking of these professionals in evaluation of the technical proposal. Their secured points are liable to be reduced by 50% if their name appears in more than 1 previous proposal in which they are ranked No.1. Also the existing load of work with a firm shall be considered as one of the factors for the consideration in the award of the work.

	iv. Form A-4 is meant for comments on provision contained in RFP and Terms of Reference (TOR) and unless the observations are noted in this particular form, anything written elsewhere on this account including financial implications, if any, shall be considered of no consequence in the evaluation process. iv. Consultants may form a Joint Venture (JV) to qualify for the Assignment in which case the contract will be signed between the Client and all members of the JV on the prescribed Form included in Appendix E (copy of Model Agreement) subject to the ranking and successful negotiations. A JV may include at the most four members. To promote the consultancy industry in the country, 50 marks (out of 1000 for Evaluation) are allocated for Transfer of Knowledge in the form of JV with a new / less experienced firm by sharing at least 20% of Assignment with them.
1.8	The Invited Consultants / Eligible Consultants are: Any firm meeting the following requirements: (a) Valid Registration Certificate of Pakistan Engineering Council with relevant Project Profile Codes. Foreign consulting firms shall make JV in accordance with Bye-Law 6(2) and Bye-Law 9 of the Pakistan Engineering Council (Conduct and Practice of Consulting Engineers) Bye-Laws 1986. Failure to provide valid Registration Certificate (license) of the firm (each member in case of JV) by the PEC will entitle the Client to reject the proposal. (b) Affidavit in original bearing the subject with project name on stamp paper duly attested by the Oath Commissioner to the effect that the firm has neither been blacklisted nor any contract rescinded in the past for non-fulfillment of contractual obligations (By all member firms in case of JV and/or sub-consultant). (c) Facilities available with the Consultant to perform their functions effectively (proper office premises, software, hardware, record keeping etc.) (d) Client's satisfaction certificates (Performance Reports) for the last three relevant assignments from the respective Clients. Moreover any adverse report regarding performance of Consultant on NHA projects received from NHA's any relevant quarter may become basis for its disqualification from the services above named in clause 1.1. (e) Signing and certification of the Checklist for Completeness of the Proposal as per attachment at the end of Data Sheet. (f) Man-months of staff and Project Duration as per TOR.
2.1	The Documents are: (a) Letter of Invitation (LOI). (b) Instructions to Consultants (ITC). (c) Data Sheet.

	(d) Technical Proposal Forms. (e) Financial Proposal Forms (f) Appendix – A: TOR and Background Information. (g) Appendix – B: Man-Months and Activity Schedule (h) Appendix – C: Client's Requirements from the Consultant. (i) Appendix – D: Personnel Equipment, Facilities and Other Services to be Provided by the Client. (j) Appendix – E: Copy of Model Agreement/ Draft Form of Contract & Appendices etc. (k) Form of Contract *(For Consultants to perform services as a Joint Venture)*
2.2	The words "Twenty one (21)" is deleted in its entirety and replaced with "Five (05)" The address for seeking clarification is: **General Manager (P&CA)** National Highway Authority 28, Mauve Area, G-9/1, Islamabad E-mail: gmpca.nha@gmail.com
3.1.1	Add following: The proposals should be bound in the hard book binding form to deny the possibility of removal or addition of page(s). All the pages of proposal must be signed and stamped in original by authorized representative of the firm/JV. All the pages must be numbered starting from first page to last. Any proposal found not adhering to these requirements will be **rejected** at the time opening.
3.1.4	d. Proposed key staff shall preferably be permanent employees who are employed with the consultants at least six months prior to submission of Proposal. **Yes** ____√___ **No** _____ The minimum required experience of proposed Key Personnel is given below:

FOR KEY PERSONNEL

Sr. Highway Engineer / Team Leader	Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience (proven fifteen (15) years' design experience as Highway/ Geometric Design Engineer on National Highways Projects); -OR- M.Sc. (Transportation Engineering) with minimum eighteen (18) years relevant experience (proven thirteen (13) years' design experience as Highway/ Geometric Design Engineer on National Highways

		Projects) He/she must also have performed as Team Leader for at least three (03) major Highway Design Projects
	Pavement Specialist	Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Pavement Specialist on major Highway Projects]; -OR- M.Sc. (Traffic Engg./ Transportation Engg./ Highway Engg.) with minimum eighteen (18) years' relevant experience [proven thirteen (13) years' design experience as Pavement Specialist on major Highway Projects]
	Structural Engineer	Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience (proven fifteen (15) years' design experience as Structure Engineer on National Highways Projects); -OR- M.Sc. (Structural Engineering) with minimum eighteen (18) years relevant experience (proven thirteen (13) years' design experience as Structure Engineer on National Highways Projects)
	Geo Technical Engineer	Minimum B.Sc. (Civil Engg./Geo-Tech Engg.) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Geo Technical Engineer on major Highways and Bridges Projects]; -OR- M.Sc. (Geo-Tech Engg.) with minimum eighteen (18) years' relevant experience [proven thirteen (13) years' design experience as Geo-Technical Engineer on major Highways and Bridges Projects]
	Traffic Engineer/ Economist	Minimum B.Sc. (Civil / Transportation/ Traffic Engineering) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Traffic Engineer/ Transport Economist on major Highways/ Transportation Projects]; -OR- M.Sc. (Transportation/Traffic Engg.)/ Transport Economist with minimum fifteen (15) years' relevant experience [proven ten (10) years' design experience as Traffic Engineer/ Transport Economist on major Highways Projects]

	Quantity Surveyor	DAE (Civil); preferably having Bachelor's in Civil Engineering; In case of DAE having minimum eighteen (18) years post-qualification experience in Highway Sector which includes proven ten (10) years' experience as Quantity Surveyor on Highway Projects; -OR- In case of Bachelor's Degree having minimum fifteen (15) years post-qualification experience in Highway Sector including seven (7) years' experience as Quantity Surveyor on Highway Projects.
	Chief Surveyor	DAE (Civil); preferably having Bachelor's in Civil Engineering. In case of DAE having minimum eighteen (18) years post-qualification experience in Highway Sector which includes proven ten (10) years' experience as Chief Surveyor on Highway Projects. -OR- In case of Bachelor's Degree having minimum fifteen (15) years post-qualification experience in Highway Sector including seven (7) years' experience as Chief Surveyor on Highway Projects.
	Surveyor	DAE (Civil); preferably having Bachelor's in Civil Engineering. In case of DAE having minimum eighteen (18) years post-qualification experience in Highway Sector which includes proven ten (10) years' experience as Surveyor on Highway Projects. -OR- In case of Bachelor's Degree having minimum ten (10) years post-qualification experience in Highway Sector including seven (7) years' experience as Surveyor on Highway Projects.
	Note: The Consultants are advised to submit updated CV's strictly in compliance with the format of CVs given in Technical Proposal Form A-5. CVs submitted without regard to the said format may score low.	
	e. Training is an important feature of this Assignment: **Yes** ___√___ **No** _____ If Yes, details of training are given in TOR	
3.2.3	Professional liability, insurances (description or reference to appropriate documentation):	

	i. The Consultants shall be responsible for Professional Indemnity Bond of the required amount at their own cost. This bond shall be in the joint name of Consultant and the Client. ii. The Consultants are required to insure their Employees and Professionals for Hospitalization/ Medical, Travel and Accident Cover for the duration of the Contract. The details provided in Para 3.5 of Special Conditions of Contract in Model Contract.
4.1	The number of copies of the Proposal required is: **Technical Proposal:** **One Original and Three copies with CD** (soft form of complete Technical Proposal in PDF Form) in sealed envelope. **Financial Proposal:** **One Original with CD** (soft form of complete Financial Proposal in PDF as well as MS Word/Excel Forms) in sealed envelope. The address for writing on the proposal is: **General Manager (P&CA)** National Highway Authority 28, Mauve Area G-9/1 Islamabad Telephone: +92-51-9032727 Facsimile: +92-51-9260419
4.4	The date and time of proposal submission is: Date: **10th October, 2017** Time: **1130 hours** Location of Submission : **NHA Main Auditorium** National Highway Authority 27, Mauve Area G-9/1 Islamabad.
4.5	Validity period of the proposal is: **180 days** The bid shall remain valid up to: **8th April, 2018** The location for negotiation of proposal is: **General Manager (P&CA)** National Highway Authority 28, Mauve Area G-9/1 Islamabad Telephone: +92-51-9032727 Facsimile: +92-51-9260419
5.2	The evaluation of technical proposal shall be based on following criteria: **Description / Items** **Points**

1.	**Experience of the Firm**		**100**
	1-a)	General Experience in road Transport Sector (25)	(25)
	1-b)	Specific Experience related to particular Assignment (75)	(75)
2.	**Approach & Methodology**		**250**
	2-a	Appreciation of the Project	(70)
	(i).	*Evidence of Site Visit with Photographs*	*(30)*
	(ii).	*Clarity of appreciation*	*(20)*
	(iii).	*Comprehensiveness of appreciation*	*(20)*
	2-b	Problem Statement/ Understanding of Objectives	(50)
	(i).	*Identification of Problems/ Objectives*	*(30)*
	(ii).	*Components of Proposed Services*	*(20)*
	2-c	Methodology	(80)
	(i).	*Proposed Solutions for this Project*	*(30)*
	(ii).	*Quality of Methodology*	*(20)*
	(iii).	*Conciseness, clarity and completeness of proposal*	*(30)*
	2-d	Suggested changes for improvement in TOR	(10)
	2-e	Work Program	(20)
	2-f	Staffing Schedule	(20)
3.	**Key Staff**		**450**
4.	**Performance Certification from clients**		**100**
5.	**Present Commitments (current engagement and available strength – justification)**		**50**
6.	**Transfer of Knowledge * (Methodology/ Plans)**		**50**
		Total Points:	**1000**

Minimum qualifying technical score: **700**

* Transfer of knowledge would be in the form of joint venture with new/ less experienced firm(s) by sharing at least 20% of Assignment with them for promoting the consultancy industry in the country.

The points earmarked for evaluation sub-criteria (3) for suitability of Key Staff are:-

	Description / Items	**Points (%)**
i.	Academic and General Qualifications	**30**
ii.	Professional experience related to the Project	**60**
iii.	Status with the firm (Permanent & duration with Firm as per LOI Clause 3.1.4 (d))	**10**
	Total Points:	**100**

5.3.1	Following is added: The words "three top-ranking qualifying consulting firms" is deleted in its entirety and replaced with the words "qualifying consultants" The date, time, and address of the financial proposal opening are: After evaluation and approval of technical proposals **(TO BE INFORMED LATER).**
5.3.3	The weights given to the Technical and Financial Proposals are: **Technical: 80%** **Financial: 20%**
6.3	Add following at the end of this Para: The final person-months of each expert are subject to adjustment at the stage of contract negotiation in line with demonstrated approaches methodology and need basis.
7.2	The assignment is expected to commence in: **January, 2018**
8	The Clause is deleted in its entirety

Checklist for Completeness of Proposal

S. No.	Description	Must attach Documents	
		In case of Single Entity	In case of JV/ Sub-Consultants
1.	Power of Attorney to submit the Proposal **(Original, scanned copy is not acceptable)**	a. By the owner/owners of Firm to authorized representative. b. In case of more than one owner, legal authority of issuing Power of Attorney of Executant itself.	a. By the owner/owners of each Firm to authorized representative. b. In case of more than one owner, legal authority of issuing Power of Attorney of Executant itself. c. Power of Attorney by the duly authorized representative(s) of member firm(s)/sub-consultant(s) to the authorized representative of Lead Firm
2.	Power of Attorney to sign the Proposal **(Original, scanned copy is not acceptable)**	a. By the owner/owners of Firm to authorized representative. b. In case of more than one owner, legal authority of issuing Power of Attorney of Executant itself.	a. By the owner/owners of each Firm to authorized representative. b. In case of more than one owner, legal authority of issuing Power of Attorney of Executants itself. c. Power of Attorney by the duly authorized representative(s) of member firm(s)/sub-consultant(s) to the authorized representative of Lead Firm
3.	Letter of Intent to form JV on firm's letterhead/ JV agreement on stamp paper **(Original, scanned copy is not acceptable)**	N.A	Each Firm (all JV members), including the Lead Firm, to sign through its authorized representative (along with authorization)
4.	TECHNICAL PROPOSAL FORMS TECH-1 to TECH-9 duly completed as per Instructions to Consultants/ Data Sheet and requirements of TOR (To be attached with Technical Proposal)	Must provide	Must provide
5.	Valid Registration Certificate of Pakistan Engineering Council with relevant Project Profile Codes	Must provide	Must provide
6.	Foreign consulting firms shall make JV in accordance with Bye-Law 6(2) and Bye-Law 9 of the Pakistan Engineering Council (Conduct and Practice of Consulting Engineers) Bye-Laws 1986	Ineligible	PEC License(s) must be provided at the time of proposal submission
7.	Affidavit on stamp paper duly attested by the Oath Commissioner to the effect that the firm has neither been blacklisted nor any contract rescinded in the past for non-fulfillment of contractual obligations	Must provide	Must be provided by all member firm(s) including the Lead firm (and sub-consultant(s) if applicable)
8.	Lists of facilities available with the Consultant to perform their functions effectively (proper office premises, software, hardware, record keeping etc.)	Must provide	Must be provided for each JV member including the Lead firm separately. In case of involvement of sub-consultant(s), will also be provided
9.	Affidavit on stamp paper duly attested by the Oath Commissioner to the effect that the proposed Personnel shall be available as per their proposed inputs in the Personnel Schedule and TOR	Must provide	Must be provided for each JV member including the Lead firm separately who has proposed Personnel. In case of involvement of Specialist sub-consultant(s), the affidavit will be signed by the individual himself
10.	Performance Certificate/ Assignment Completion Certificate (All completed projects mentioned under TECHNICAL PROPOSAL FORM A-2 CLIENT'S	Must provide	Must be provided for completed projects of each member including Lead firm

S. No.	Description	Must attach Documents	
		In case of Single Entity	In case of JV/ Sub-Consultants
	REFERENCE **Note:** Any project mentioned completed under Form TEC-2B will not be considered for evaluation unless Performance Certificate/ Assignment Completion Certificate with satisfactory remarks by the client's representative is not attached. The Client NHA reserves the right to verify the Performance/Assignment Completion Certificates.		
11.	Integrity Pact Document duly filled in the blank spaces with requisite information and signed/ stamped	Must provide	Must provide
12.	FINANCIAL PROPOSAL FORMS FIN-1 to FIN-7 duly completed as per Instructions to Consultants/ Data Sheet and requirements of TOR **(To be attached with Financial Proposal)**	Must provide	Must provide
13.	Audit Reports of the firm for past three years duly certified by Chartered Accountant **(To be attached with Financial Proposal)**	Must provide	Must be provided for each firm who proposes Personnel for the Assignment
14.	Sequential page numbering of Proposal. Signing and stamping of proposal (Technical and Financial) wherever indicated as well as initial/ signature and seal on all other pages of proposals. The Proposal is bound as hard book to deny addition/ removal of pages	Must fulfill the requirement	Must fulfill the requirement

Certification:-

I, the undersigned, certify to the best of my knowledge and belief that all above mentioned documents (as applicable), Sr. No.1 to 11 have been attached to our proposal and signed and stamped as per requirement mentioned at Sr. No.12. In the event of any sort of falsification of this certification, the Client NHA may at its sole discretion disqualify our firm from bidding for the Assignment named under Data Sheet Sub-Clause 1.1.

Signature of authorized representative of the firm(s) Date: _____
Day/Month/Year

Full name of authorized representative: _____

For and on behalf of: _____{Name of the bidder}_____

_____
(Seal)

Note: copy or scanned signatures are not allowed

SUMMARY EVALUATION SHEET FOR FULL TECHNICAL PROPOSALS (QCBS)

EVALUATION CRITERIA		Max. Weight	Firm 1		Firm 2	
			Rating	Score	Rating	Score
1. Firms Experience		**100**				
	General Experience in road Transport Sector	25				
	Specific Experience related to particular Assignment	75				
2. Approach and Methodology		**250**				
	2-a. *Appreciation of the Project*	70				
	(i) Evidence of Site Visit with Photographs	(30)				
	(ii) Clarity of appreciation	(20)				
	(iii) Comprehensiveness of appreciation	(20)				
	2-b. Quality of Methodology	50				
	(i) Identification of Problems/ Objectives	(30)				
	(ii) Components of Proposed Services	(20)				
	2-c. Methodology	80				
	(i) Proposed Solutions for this Project	(30)				
	(ii) Quality of Methodology	(20)				
	(iii) Conciseness, clarity and completeness of proposal	(30)				
	2-d. Suggested Changes for Improvement in TOR	10				
	2-e. Work Program	20				
	2-f. Staffing Schedule	20				
3. Key Personnel		**450**				
	Sr. Highway Engineer / Team Leader	125				
	Pavement Specialist	75				
	Structure Engineer	85				
	Geo Technical Engineer	85				
	Traffic Engineer/ Economist	80				
4. Performance Certification from clients		**100**				
5. Present Commitments (current engagement and available strength – justification)		**50**				
6. Transfer of Knowledge (Methodology/ Plans)		**50**				
	TOTAL:	**1000**				

Excellent - 100% Very Good - 90-99% Above Average – 80-89% Average – 70-79% Below Average – 1-69% Non-complying – 0%
Score: Maximum Weight x rating / 100.
Minimum qualifying score is 70% or 700 marks.

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PERSONNEL EVALUATION SHEET

POSITION / AREA OF EXPERTISE	Name	Academic and General Qualification* Weight 30%		Project related Experience Weight 60%		Status with the Firm** 10%		OVERALL RATING (Sum of Weighted Ratings)
(Show all experts to be evaluated)		Percentage Rating	Weighted Rating (A)	Percentage Rating	Weighted Rating (B)	Percentage Rating	Weighted Rating (C)	(A+B+C)
a) Sr. Highway Engineer / Team Leader								
b) Pavement Specialist								
c) Structure Engineer								
d) Geo Technical Engineer								
e) Traffic Engineer/ Economist								

Rating: - Excellent - 100% **Very good – 90-99%** **Above Average – 80-89%** **Average – 70-79%** **Below Average – 1-69%** **Non-complying - 0%**

Score: Maximum Weight X rating / 100.

* For Sr. Highway Engineer / Team Leader, Pavement Specialist, Structural Engineer, Geo Technical Engineer, Traffic Engineer/ Economist: M.Sc. with additional trainings/ courses relevant to assignment -100%; M.Sc. - 90%; B.Sc. with additional trainings/ courses relevant to assignment - 80%; B.Sc. - 70%

** Regular Employee - 100%;
First time for this assignment - 0%

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TECHNICAL PROPOSAL FORMS

Form A-1

TECHNICAL PROPOSAL SUBMISSION FORM

{Location, Date}

To: [Name and address of Client]

Dear Sirs:

We, the undersigned, offer to provide the consulting services for [**Insert the Project Name**] in accordance with your Request for Proposals dated [Insert Date]. We are hereby submitting our Proposal, which includes this Technical Proposal and a Financial Proposal sealed in a separate envelope.

[{If the Consultant is a joint venture, insert the following: We are submitting our Proposal in a joint venture with: {Insert a list with full name and the legal address of each member, and indicate the lead member}. We have attached a copy {insert: "of our letter of intent to form a joint venture" or, if a JV is already formed, "of the JV agreement"} signed by every participating member, which details the likely legal structure of and the confirmation of joint and severable liability of the members of the said joint venture.

OR

If the Consultant's Proposal includes Sub-consultants, insert the following: We are submitting our Proposal with the following firm(s) as Sub-consultants: {Insert a list with full name and country of each Sub-consultant.}]

We hereby declare that:

(a) All the information and statements made in this Proposal are true and we accept that any misinterpretation or misrepresentation contained in this Proposal may lead to our disqualification and/or may be sanctioned by the Client.

(b) Our Proposal shall be valid and remain binding upon us for the period of time specified in the Data Sheet, Clause 4.5.

(c) We have no conflict of interest in accordance with LOI Clause 1.9.

(d) We meet the eligibility requirements as stated in Data Sheet Clause 1.8.

(e) Neither we, nor our JV Partner(s)/sub-consultant(s) or any of the proposed experts prepared the TOR for this consulting assignment.

(f) Within the time limit stated in the Data Sheet, Clause 4.5, we undertake to negotiate a Contract on the basis of the proposed Key Experts. We accept that the substitution of Key Experts for reasons other than those stated in Letter of Invitation, Clause 6.5 may lead to the termination of Contract negotiations.

(g) Our Proposal is binding upon us and subject to any modifications resulting from the Contract negotiations.

We undertake, if our Proposal is accepted and the Contract is signed, to initiate the Services related to the Assignment not later than the date mentioned in Data Sheet 4.5 (*or the date extended with the written consent of Consultant in case of delay in procurement process)*

We understand that the Client is not bound to accept any or all Proposal(s) that the Client receives.

We remain,

Yours sincerely,

Authorized Signature {In full and initials}: _____

Name and Title of Signatory: _____

Name of Consultant (company's name or JV's name): _____

In the capacity of: _____

Address: _____

Contact information (phone and e-mail):_____

{For a joint venture, either all members shall sign or only the representative member, in which case the power of attorney to sign on behalf of all members shall be attached}

Form A-2

CLIENT'S REFERENCE

Relevant Services (as per RFP notice) Carried Out in the Last Ten Years Which Best Illustrate Qualifications

Using in the format below, provide information on each reference assignment for which your firm, either individually as a corporate entity or as one of the major companies within a consortium, was largely contracted.

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 Current US$ /Rs.)
Name of Associated Firm (s), if any:		No. of Months of Professional Staff Provided by Associated Firm(s)
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed:		
Narrative Description of Project		
Description of Actual Services Provided by Your Staff		

Consultants' Name: _____

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Form A-3

APPROACH PAPER ON METHODOLOGY PROPOSED FOR PERFORMING THE ASSIGNMENT

Form A-4

COMMENTS/SUGGESTIONS OF CONSULTANT

On the Terms of Reference (TOR)

1.

2.

3.

4.

5.

6.

Etc.

On the data, services and facilities to be provided by the Client specified in the TOR.

1.

2.

3.

4.

5.

Etc.

Form A-5

FORMAT OF CURRICULUM VITAE (CV) FOR PROPOSED KEY STAFF

1. Proposed Position: _____
2. Name of Firm: _____
3. Name of Staff: _____
4. Profession: _____
5. Date of Birth: _____
6. Years with Firm: _____
7. Nationality: _____
8. N.I.C Number: _____
9. Cell Number: _____
10. Membership in Professional Societies: _____
    (Membership of PEC is Mandatory)
11. Detailed Tasks Assigned on the Project: _____

_____

- Key Qualifications:

[Give an outline of staff member's experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations. Use up to one page].

- Education

[Summarize college/university and other specialized education of staff member, giving names of institutions, dates attended and degrees obtained].

- Employment Record

[Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organizations, title of positions held and location of assignments. For experience in last ten years, also give types of activities performed and Client references, where appropriate].

- Languages

[Indicate proficiency in speaking, reading and writing of each language: excellent, good, fair, or poor].

- Certification

I, the undersigned, certify to the best of my knowledge and belief that

(i) This CV correctly describes my qualifications and experience.

(ii) I am not a current employee of the Executing or the Implementing Agency.

(iii) In the absence of medical incapacity, I will undertake this assignment for the duration and in terms of the inputs specified for me in Form A-9 provided team mobilization takes place within the validity of this proposal.

(iv) I was not part of the team who wrote the terms of reference for this consulting services assignment

(v) I am not currently debarred by any department/organization/ (semi-autonomous/ autonomous) bodies or such like institutions in Pakistan.

(vi) I certify that I have been informed by the firm that it is including my CV in the Proposal for the {name of project and contract}. I confirm that I will be available to carry out the assignment for which my CV has been submitted in accordance with the implementation arrangements and schedule set out in the Proposal.

If CV is signed by the firm's authorized representative:

(vii) I, as the authorized representative of the firm submitting this Proposal for the {name of project and contract}, certify that I have obtained the consent of the named expert to submit his/her CV, and that s/he will be available to carry out the assignment in accordance with the implementation arrangements and schedule set out in the Proposal, and confirm his/her compliance with paras (i) to (v) above.

(viii) Latest colored attested photograph stapled attached with the CV.

I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Signature of expert or authorized representative of the firm

Date: _____
Day/Month/Year

Full name of authorized representative: _____

Note: copy or scanned signatures are not allowed

Form A-6

COMPLETION AND SUBMISSION OF REPORTS AS PER TOR

Reports		Date
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Form A-7

COMPOSITION OF THE TEAM PERSONNEL AND THE TASKS TO BE ASSIGNED TO EACH TEAM MEMBER

1. Technical / Managerial Staff

NAME	POSITION	Tasks Assignment	Present location	Name of assignment involved and clients name

Form A-8

WORK PLAN / ACTIVITY SCHEDULE

Items of Work/Activities	Monthly Program from date of assignment (in the form of a Bar Chart)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Form A-9

WORK PLAN AND TIME SCHEDULE FOR KEY PERSONNEL

Name	Position	Months (in the form of a Bar Chart)															Number of Months
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

Full Time: _____
Part Time: _____ Activities Duration _____

Yours faithfully,

Signature _____
(Authorized Representative)

Full Name _____
Designation _____
Address _____

Form A-10

CURRENT COMMITMENTS OF THE FIRM

(List MUST be comprehensive including projects from clients other than NHA as well)

Name of project	Single or JV	Task Assignment	Start date of the project	Expected date of completion

FINANCIAL PROPOSAL FORMS

Form A-11

FINANCIAL PROPOSAL SUBMISSION FORM

{Location, Date}

To: [Name and address of Client]

Dear Sirs:

We, the undersigned, offer to provide the consulting services for [**Insert the Project Name**] in accordance with your Request for Proposal dated [Insert Date] and our Technical Proposal.

Our attached Financial Proposal is for the amount of {Insert amount in words and figures}, *including all Federal, Provincial & Local taxes applicable as per law of the land.* {Please note that all amounts shall be the same as in Financial Proposal Form A-17}.

Our Financial Proposal shall be binding upon us subject to the modifications resulting from Contract negotiations, up to expiration of the validity period of the Proposal, i.e. before the date indicated in Clause 4.5 of the Data Sheet.

We confirm that we have no condition to state that may have financial implications over and above the amount quoted above.

We understand you are not bound to accept any Proposal you receive.

We remain,

Yours sincerely,

Authorized Signature {In full and initials}: _____
Name and Title of Signatory: _____
In the capacity of: _____
Address: _____
E-mail: _____

{For a joint venture, either all members shall sign or only the representative member/consultant, in which case the power of attorney to sign on behalf of all members shall be attached.}

Form A-12

BREAKDOWN OF RATES FOR CONSULTANCY CONTRACT

Project: _____ Consultant: _____

Name	Position	Basic Salary per Cal. Month	Social Charges (%age of 1)	Overhead (%age of 1+2)	Sub-Total (1+2+3)	Fee (%age of 4)	Rate per Month for project Office	Field Allow. (%age of 1)	Rate per Month for Field Work
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

Notes:

Item No. 1 Basic salary shall include actual gross salary before deduction of taxes. Payroll sheet for each proposed personnel should be submitted at the time of negotiations.

Item No. 2 Social charges shall include Client's contribution to social security, paid vacation, average sick leave and other standard benefits paid by the company to the employee. Breakdown of proposed percentage charges should be submitted and supported (see Form A-13).

Item No. 3 Overhead shall include general administration cost, rent, clerical and junior professional staff and business getting expenses, etc. Breakdown of proposed percentage charges for overhead should be submitted and supported (see Form A-14).

Item No. 5 Fee shall include company profit and share of salary of partners and directors (if not billed individually for the project) or specified in overhead costs of the Company.

Item No. 7 Normally payable only in case of field work under hard and arduous conditions.

Note 1 The minimum percentage of item (1) should preferably be 50% of (8).

Note 2 The consultant is to provide appointment letter and affidavit/undertaking duly signed by each of the individual staff members showing salary rates as above. Further during execution each invoice will also be provided showing that the professionals have been paid their salaries as per basic rates specified therein. Failing to which, the Client will take punitive action against the consultant and shall deduct the deficient amount from his monthly invoice. Moreover, it will be considered as a negative mark on his performance that will be considered for future projects.

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Full Name: _____
Signature: _____
Title: _____

Form A-13

BREAKDOWN OF SOCIAL CHARGES

Sr. No.	Detailed Description	As a %age of Basic Salary

Form A-14

BREAKDOWN OF OVERHEAD COSTS

Sr. No.	Detailed Description	As a %age of Basic Salary and Social Charges

Form A-15
Page 1 of 2

ESTIMATED LOCAL CURRENCY SALARY COSTS/ REMUNERATION

Sr. No.	Position	Name	Staff-Months	Monthly Billing Rate	Total Estimated Amount (Rs.)
I.	**Professional / Key Staff**				
Sub-Total:					

ESTIMATED LOCAL CURRENCY SALARY COSTS/ REMUNERATION

Sr. No.	Position	Staff-Months	Monthly Billing Rate	Total Estimated Amount (Rs.)
II.	**Non-Key / Support Staff**			
Sub-Total:				

Note: The bidders are required to quote the rates of Non Key/ Support Staff given in the TOR in above table. The bidder(s) may propose Non Key/ Support Staff Person-Months in addition to those given in TOR; however, in such a case tenable reasons must be given in the Technical Proposal Submission Form A-4 "Comments on TOR". The Client's negotiation committee will deliberate on the requirement of additional staff during negotiation meeting. It is also to be noted that the Client is not bound to agree to the reasons given in Form A-4.

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Form A-16

DIRECT (NON-SALARY) COSTS

Sr. No.	Nomenclature	Unit	Qty.	Unit Price (Rs.)	Total Amount (Rs.)
1.	Rent for Office Accommodation	L.S			
2.	Office Utilities Costs	L.S			
3.	Cost / rental of Furniture / Furnishings	L.S			
4.	Cost (rentals) of Office/Other Equipment i. Computers and accessories ii. Photo copy machines iii. Communication equipment iv. Drafting / Engineering equipment v. Surveying instruments (rentals) vi. Transport Vehicles (Rentals) vii. Site visits and Meetings in Islamabad during currency of Project and coordination during supervision	L.S			
5.	Communication expenses	P.Month	2.50		
6.	Drafting/ Reproduction of Reports	L.S			
7.	Office/ Drafting Supplies	L.S			
8.	Cost of EIA Study	L.S			
9.	Soil Investigation along the Alignment	L.S			
10.	Provisional Sum Items				
	a. Geotechnical Investigation for Structures	P.S	-	-	2,000,000/-
	b. Satellite Imageries	P.S	-	-	1,000,000/-
	c. Cost of Hydrology/ Hydraulic Study	P.S	-	-	800,000/-
11.	Others not covered above to comply with TOR requirement*				
	Total				

* Any additional item/ cost quoted against this line item must be supported by solid/ tenable justification(s) detailed in Technical Proposal Submission Form A-4 "Comments on TOR" without indicating financial value therein. The negotiation committee of the Client may negotiate this cost on the basis of justification provided in the form A-4 with the prospective successful bidder in the light of Clause ITC 6.6 of RFP. Moreover, if no justification is given or Client does not agree to the

justifications, the Client in both the cases **shall not** include this cost in the total cost offered by the Consultants for this assignment, particularly in case any amount against this line item is deemed to have been covered in other pay items.

Form A-17

SUMMARY OF COST

Sr. No.	Description	Amount (Rs.)
1.	Salary Cost / Remuneration	
2.	Direct (Non-Salary) Cost	
3.	Sub Total (1+2):	
4.	Sales Tax @ 16% on item S.No.3 above which shall be kept as Provisional Sum in the Contract Agreement	
5.	**Grand Total:**	

Note: 1- This cost is supposed to be built up in bid price and if anything is left blank it shall be deemed to be included in the cost.

2- The dues and salaries of staff are payable by the consultant in time and not later than 10th of the following month positively. In case of failure to do so Client shall intervene and pay these dues and salaries of the concerned Personnel and recover from the invoice of the consultant at actual charges paid plus 1% of the amount. This will also be accounted for adversely in making assessment of the Consultants in the next evaluation process for selection of consultants with report of such defaults.

3- The grand total is inclusive of all the applicable Federal, Provincial and Local taxes. All these taxes (except the Sales Tax) are required to be built in the quoted rates and not be mentioned separately.

4- Any Omission or arithmetical error made by the Consultants in entering the amount against item 4 above shall also be rectified during evaluation of the Financial Proposal.

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APPENDIX-A

TERMS OF REFERENCE

(TOR)

CHAPTER NO. 1

INTRODUCTION

1.1 Background

Prime Minister's Office vide letter U.O.no. 2016 /M/SPM/2017 dated 5th June, 2017 conveyed that "During visit to Chichawatni on 11th May, 2017, the Prime Minister has been pleased to make the following announcement (pertaining to NHA) with the direction to take further necessary action for immediate implementation by the concerned Ministries/ Executing Agencies:-

Sr. No.	Announcements made	Action by
	To connect Chichawatni with Lahore/ Multan Motorway	NHA

In pursuance of that, National Highway Authority intends to appoint Consultants for Feasibility Study & Detailed Design for Improvement & Dualization of Existing Chichawatni – Lahore/ Multan Motorway M-3 link Road (44 km).

The feasibility study and detail design for link road between Chichawatni and Lahore/Multan Motorway M-3 mainly covers the following:

- improvement of existing carriageway (as per NHA Standards);
- construction of Additional Carriageway along the existing alignment;
- all existing structures/ bridges including main bridge at river Ravi required to be inspected for dualization (keeping in view design life), design of structure will be carried out. Feasibility study is required for railway over head bridge at railway crossing near Kamalia (if it is feasible then may be considered for detail design);
- to dualize the existing flyover in Chichawatni City design Consultants will present its recommendation/ working to Client prior to finalizing the said matter;
- improvement of Ghani Chowk will be finalized, keeping in view, traffic congestion of N-5 and Burewala – Chichawatni road to avoid accidents and from architectural perspective.

The tasks to be completed by the Consultants include but not limited to following:

i. Tender drawings, documents and BOQ;

ii. Environmental Impact Assessment (EIA) in all respect including approval from approving agencies/ authorities;

iii. Land acquisition and utilities relocation details and cost estimates;

iv. Hydraulic Model Study (if required for Bridge at river Ravi);

v. Existing road/ railway traffic diversion/ control plan (if required);

vi. Economic and Social indicators;

vii. Preparation of PC-I.

1.2 Need Assessment

- National Highway N-5 Lahore-Multan section is passing through major populated cities of Punjab province like Okara, Sahiwal, Chichawatni, Mian Channun, Khanewal etc. The commuters from Southern Punjab, presently travel through N-5 for Islamabad, Northern areas and Khyber Pakhtunkhwa. One of the purposes of constructing Motorway projects of Lahore-Abdul Hakeem (M-3), Faisalabad- Multan (M-4) projects is to ease out traffic on N-5. Currently a number of existing traffic of N-5 is using the existing provincial road network starting from Chichawatni and passing through Kamalia, T-T Singh, Rajana to approach Islamabad and other northern territory of country through already constructed portion of M-4 from Gojra - Faisalabad. Improvement and dualization of this link road will facilitate the existing and generated traffic due to construction of Motorway projects originating from Southern Punjab.

- Employment opportunities will be created for people in the project vicinity.

- Improvement and dualization of the existing link road will result in significant benefits to the economy and socio economic up left of the area.

1.3 Project Definition

The Project envisages the Construction of 2-Lane new additional carriageway on NHA Standards in addition to improvement of existing carriageway connecting Chichawatni with Motorway M-3 i.e. Rajana, Kamalia and Chichawatni. The existing structures/ Bridges will also be improved as a 4-Lane facility. The drainage, protection and retaining structures along the existing road will also have to be improved. It is highlighted that if any activity observed from local department may be intimated to NHA prior to finalization of the assignment.

1.4 Project Objectives

The Project provides major tangible and intangible benefits enumerated below:

i. Provision of efficient road section through dualization of existing road will provide uninterrupted traffic flow. This will increase the vehicle operating speed thereby reducing the journey time and vehicle operating cost. This will result in stimulation of economy;

ii. Time and Accident saving of traffic user will be possible;

iii. Reduction of cost of all suppliers and cost of living index.

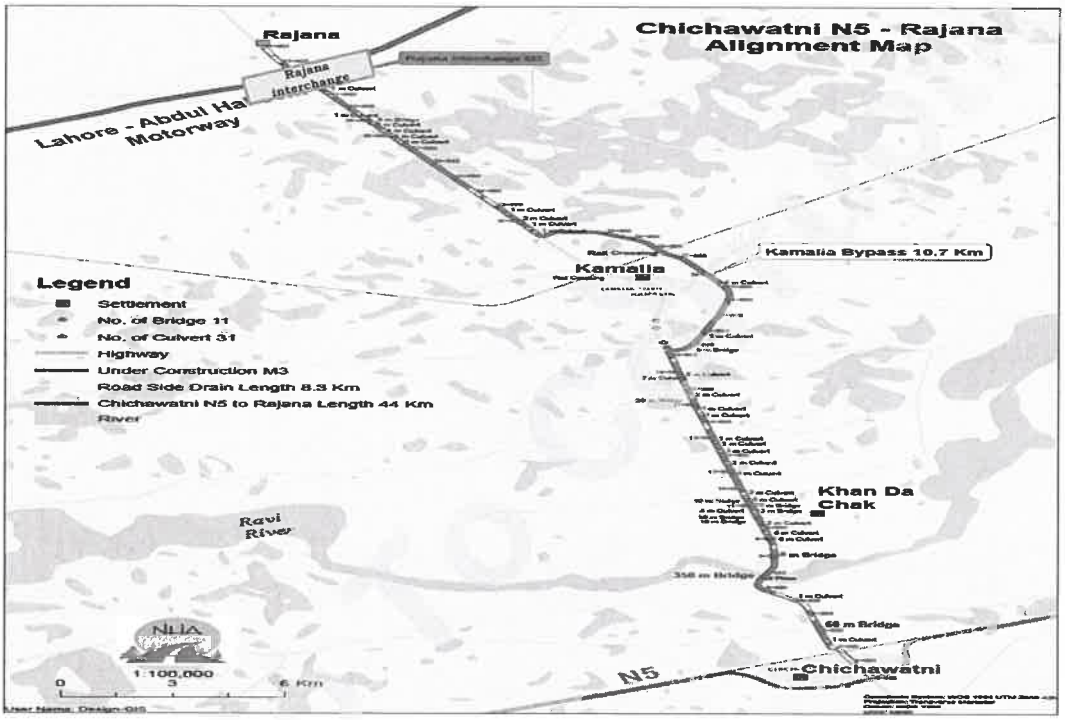
iv. Creation of employment opportunities during and after the implementation of the project thus alleviating the poverty of the area.

CHAPTER NO. 2

DESCRIPTION OF PROJECT

2.1 Location of Project

The start point of the existing road from M-3 to Chichawatni falls/originates from Rajana M-3 interchange on Lahore-Abdul Hakeem Motorway and after crossing through Kamalia and Khan Da Chak terminates at Ghani chowk on Chichawatni Bypass National Highway N-5. Location of the proposed Bridge is given below:



2.2 Project Works

The Project envisages the Construction of 2-Lane new additional carriageway on NHA Standards in addition to improvement of existing carriageway connecting Chichawatni with Motorway M-3 i.e. Rajana, Kamalia and Chichawatni. The existing structures/ Bridges will also be improved as a 4-Lane facility. The drainage, protection and retaining structures along the existing road will also have to be improved. It is highlighted that if any activity observed from local department may be intimated to NHA prior to finalization of the assignment. The link Ghani Chowk in Chichawatni will be developed properly, keeping in view, the traffic congestion of N-5, Burewala and Chichawatni to avoid road accident.

2.3 Time of Start

The Services shall be commenced immediately after issuance of the Letter of Commencement by the Client's Representative.

2.4 Time Period

The Services specified in the TOR shall be completed and all the relevant reports submitted in the form and format acceptable to the Client, within **two and half (2.50) months** from the Date of Commencement.

CHAPTER NO. 3

SCOPE OF WORK

3.1 Scope of Work

The Scope of Work for the Present Terms of Reference comprises of following but not limited to:

Stage I

- Comments on Terms of Reference at bidding stage;
- Data Collection/ Co-ordination with local Departments;
- Desk study and Reconnaissance visit;
- Inception Report to elaborate the TOR and specifics of the Projects;
- Detailed topographic survey;
- Detailed Soil Investigation Survey on the proposed alignment;
- Identification of quarry sites and Construction Material Survey;
- VOC and VOT sample survey;
- Technical and Economic Feasibility Study alongwith Identification of quantifiable benefits (Project specifics);
- Geometric Design;
- Road furniture design, traffic signs and gantries;
- Hydrology & Hydraulic design of structures;
- Structure Design;
- Horticulture and Landscaping of intersections;
- Traffic survey and Axle load survey;
- Pavement Design with surface and subsurface drainage;
- Environment Impact study and Social Impact Assessment;
- Provision of ducts/crossing of future utilities like OFC, pipelines etc.;
- Highway Safety Audits by third party to be decided by NHA;
- Tender Documents, BOQ, Engineer's Estimate PC-1;
- Stakeout of design alignment after approval for ground validation;
- Utility folders and Land acquisition plans using imageries, cadastral maps on GIS;
- Fixation of ROW markers when required by the Client;
- Training of NHA Engineers in field and at Consultants' head-office premises.

3.2 Design Standards

Following design standards and Codes Shall be followed:

The project will be four lane divided carriageway with:

Carriageway Width	7.0 m (Two lanes each of 3.5 m)
Shoulder Width	Inner 0.6m for both sides and 2m outer shoulder
Cross fall normal	Carriageway 2% Shoulder 4%
Median	As per NHA standards keeping in view R.O.W availability standards and specification
Max rate of Super elevation	6%
Geometric Design Standards	"A Policy on Geometric Design of Highway & Streets 2011"
Classification of Highway	Expressway
Design Speed	100 Kph
Design Vehicle	6- Axle Trailer (1.22+222)
Maximum Grade	4%
Minimum Grade	0.5% in cut and 0.3 % in fill
Drainage	Design for proper drainage

Other Design Parameters

S.No.	Design Element	Unit	Standard	
1.	Design speed	KPH	100	
2.	Max rate of supper elevation	%	6	
3.	Min. grade		In fill 0.3% In cut 0.5%	
4.	No. of lane		4	
5.	Min Vertical Clearance over Road		5.3m	
6.	Min Vertical Clearance over Railway		6.5	
7.	Right of way	m	45.7	
			Main Carriageway	Ramps
8.	Max. Vertical Gradient	%	1.5%	3%
9.	Minimum Radius	m	1000	
10.	Flyover Bridge	m	5.50	
11.	Under Pass	m	5.30	

Above standards are derived from "A Policy on Geometric Design of Highway & Streets 2011".Any Design element not mentioned above should conform to the latest AASHTO Design Guide.

3.2.1 STANDARDS FOR STRUCTURES

Codes And Standards:

For analysis and design of structures following codes, standards and loads will be adopted.

- **AASHTO-(Latest Edition):**
  For analysis and design for all loads and load combinations.

Pakistan Highway Code of practice for Bridges 1967: -
For vehicular loads, their spacing & impact factors.

- **UBC/IBC 2003: -**
For seismic zoning in addition to the latest risk map of Pakistan.

- **ASTM: -**
For material specifications & testing

- **ACI: -**
For analysis, design and detailing, only in case such details are not specified in AASHTO.

Vehicles live load

West Pakistan Code of Practice for Highway Bridges 1967 (WPCHB) specifies more severe loads to be considered in combination with other loads such as dead load etc. As follows:

- **Class AA loading:-**
The 70-Ton tracked military vehicle to be placed in accordance with WPCHB to give maximum stresses.

- **Class A loading:-**
The 54.5 Ton train of trailers (with different axle loads) to be placed in accordance with WPCHB to give maximum stresses.

- **Check Deck Slab for Punching Shear:-**
Additionally the bridge deck slab shall be checked in Punching Shear for a Wheel Load of 21,000 Pounds [95 KN].on 0.25 x 0.5m2 tire contact area.

Other Loads

- **Side Walk Live Load:-**

A load of 5 KN/m2 (100 psf) of walkway between side barrier/railing and shoulder, applied continuously or discontinuously over both lengths and width of structure in order to produce maximum stresses in the member under consideration.

- **Horizontal Live Load on Railing/Posts of Side Barrier:-**
These depend upon the configuration of the railing/posts/ barrier system. The position and the magnitude of the horizontal loads are taken according to Article 2.7 of AASHTO.

- **Impact load:-**
Impact loading on the bridge superstructure is taken in accordance with WPCHB.

- **Wind Loads:-**
Wind loads are taken in accordance with the provision of WPCHB.

- **Seismic Design:-**
  International Building Code (IBC-2003) and Earthquake forces are calculated according to article 3.21 of AASHTO, keeping in view the latest seismic map of Pakistan.

3.2.3 EXISTING STRUCTURES

Consultants shall carry out detailed inspection of existing structures and based on condition of the structure shall recommend retention of existing structures or replacement. Where existing structures are retained, design for widening/ extension of existing structures shall be carried out to commensurate with NHA standards for X-section of the road and structures. Condition Survey Report as per **NHA's standard Form,** along with two photographs of each existing structure will be submitted.

Structural Analysis
Structural Analysis shall preferably be performed using Staad Pro or Staad III. All input files shall be provided in the design report.

River Training Works
Guide Banks, spurs and protection works will be designed for high flood discharge and flow pattern determined by design calculations and hydraulic model study. Detail Drawings of the River training works will form part of Hydraulic Report and Tender Package.

3.2.4 ROADSIDE DESIGN STANDARDS

Roadside design pertains to the design of area between the outside shoulder edge and ROW limits. It involves safe design of features like embankment slopes, cut slopes, roadside clearances, roadside drainage slopes, design of road signs and luminaire with breakaway supports, roadside barriers and bridge railings etc. The AASHTO Road Side Design Guide Jan, 1996 shall be followed.

3.3 Correctness of Design & Co-ordination Engineer

Consultants is entrusted with the Scope of Work outlined above. It is required that the Consultants should undertake the job in a professional manner to the best of his ability and resources. NHA as Client will vet the design drawings through its design review and Supervision consultant. The Design will be approved for construction after the clearance of design review consultant.

The clearance of design review consultant does not absolve the Consultants from its obligation to develop correct and cost effective engineering solutions for the Projects. NHA reserves the right to take punitive actions as required at appropriate forum even during construction stage.

Task 1:	**Data Collection & Co-ordination with local/Departments Consultants get hold of relevant information, SOP Maps, Satellite imageries and liaison with local department/police**
Outcome:	**Reconnaissance Survey Report**

4.1 Data Collection & Co-ordination with Local Departments

Immediately after signing of the Contract, the Consultants will get possession of the relevant maps, reports and imageries for the detailed design of the Projects. After the Completion of the design, SOP maps and imageries shall be returned back to the Client in Original and un-damaged. In case any authorization is required by the Government in obtaining the information, same shall be provided by NHA in the form of letter. The Consultants should inform the local police and administration before conducting all types of field surveys. Before planning the field reconnaissance, the Consultants should co-ordinate meetings with the local city development / Highway Department to know any future plans for city expansion etc. Tips for design of Bypasses shall be obtained as per local requirements.

Task 2:	**Alignment Report** **Consultants shall submit an Alignment Report based on the alignment studies encompassing the strategies for improvement of existing road along with dualization approach. Approval of alignment in presentation to the Client**
Outcome:	**Alignment Report**

4.2 Identification of Alignment Alternatives with Recommended alignment

The requirement of Task-2 is the submission of Inception Report and Alignment Report. Inception Report should elaborate the methodologies for detail design for requirements spelled out in the TOR and observations made in the site visit. Based on the alignment studies, the Consultants shall stipulate the strategies of improvements and dualization of existing road in the alignment study report.

After submission of Alignment report and Inception report, the Consultants will give his presentation to the Competent Authority in NHA for approval of alignment.

Task 3:	**Detailed Topographic Survey**
Outcome:	**Consultants will get approval of Topographic survey Program** **Submit Survey Report** **Submit Draft and Final Topographic Plans**

3.1 Detailed Topographic Survey (Pre-requisites)

Topographic survey forms the basis for the detailed design. Poor quality of survey work produces not only incorrect designs but also results in post construction problems with variations in cost and claims. It will be ensured by NHA that the Survey work is of top most

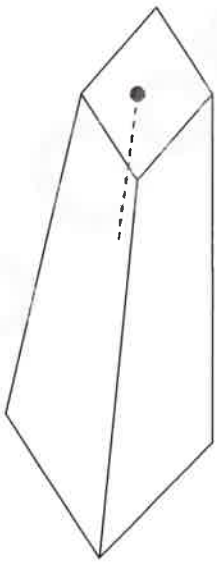
order. It is therefore recommended that Consultants should use the latest technology for the topographic surveys, which include GPSDF (4-5 in number) for establishment of high accuracy control points. In case the Consultants does not have the requisite number of GPSDF, he is advised to hire services of professional survey companies having the required expertise. The GPSDF shall be simultaneously used on SOP Bench Marks as well as BMs established for the Projects (Start and End).

The Consultants shall specify *the time line of survey program*. Total *number of equipments* with models and *calibration certificates not more than 6 months old* shall be produced. The *name and qualifications of surveyors* shall also be submitted. NHA reserves the right to interview the surveyor if required.

Upon request, the Consultants should change the surveyor. If *Consultants wants to outsource the Survey work, it will be mandatory to take prior approval of the Client*. NHA will ensure that the survey firm is not black listed and has sufficient resources and compliance of Surveying and Mapping ACT 2014.

4.3.1 SURVEY MONUMENTS

The type and dimensions of Survey monuments to be installed at site is shown here. Besides start and at the end, it is required that these markers shall be fixed in the traverse line at an interval of about 300 to 400 meters. These shall be fixed at such locations that these are least susceptible to disturbance and damage. The Consultants shall fill out a proforma for each traverse station as attached in **Annexure-T3**.



Permanent Ground Monument made of Concrete 1:4:8 with 75 mm steel nail embedded at center. Using spray paint and a stencil, the monument number shall be painted.

The size of monument shall be 150 mm square at top and 300 mm square at bottom. The height of monument shall be 900 mm. Out of which 750mm shall be buried in the ground.

4.3.2 CONTROL FOR TRAVERSE

The control for traverse shall be established with the Survey of Pakistan Grid Lambert Conical Projection with Everest datum. GPSDF sets shall be used to connect the Traverse with the SOP BM.

4.3.3 SURVEY CORRIDOR

The detailed topographic survey shall be carried out in 22.75 i.e. 12.35 m from the centerline of existing road. At locations of crossing rivers, nullas the detail of survey extent is given in respective sections.

4.3.4 SURVEY ACCURACY

The accuracy of the Traverse should not be less 1:20,000. During leveling control of all traverse stations, double circuit leveling shall be carried out. The datum of all reduced levels is mean sea level and shall conform to Survey of Pakistan Bench mark levels.

Vertical disclosures within the leveling net and between Survey of Pakistan Benchmarks shall not exceed the lesser of the following:

a) ± 16mm
b) ± (20 / K) mm
c) where K is the sum of the distances leveled in kilometers.

All leveling shall be done in sections of approximately 1 km in length.

4.3.5 MAPPING (UNIT OF MEASUREMENT)

Metric units shall be used throughout.

4.3.6 SCALE

Besides soft copy, mapping of drawings shall be plotted to a scale of 1:1000.

4.3.7 GRID AND DETAILED ACCURACY

Mapping shall be based on the grid system defined above. Gridlines and Permanent Ground Markers shall be drawn using plotter. Well defined points of detail shall be plotted in their true positions at map scale to ± 0.3mm root mean square error when coordinated scale off the map from the nearest grid line are compared with coordinates determined by measurement on the ground from the nearest Permanent Ground Markers (90% of a representative sample of well defined points shall be within ± 0.5mm).

4.3.8 DETAILS TO BE SHOWN

BUILDINGS/STRUCTURES

1. The plinth line of all permanent buildings.
2. Construction type of building (whether brick (B), semi-concrete (SC), concrete (C). double storey (D) etc.).
3. Ruins or partially demolished buildings or foundations – by the wall and masonry visible at the time of the survey.
4. Names and type of usage of all buildings, schools etc.
5. Buildings under construction.

ROADS, TRACKS AND FOOTPATHS

1. Kerb line or edge of surfacing to carriageways, and along the edge line markings.
2. Tracks.
3. Pedestrian bridges and footpaths.
4. Traffic islands (similar to kerb line).
5. Destination of road for junctions level.

6. Bridges (over railway, river, etc).
7. Levels over railway line in case of at grade or grade separated crossings.
8. In case of power transmission lines crossing alignment, level of electric wire with respect to survey control shall be recorded.

INDUSTRIAL

1. Name and type of industry, Boundary wall and building structure inside
2. Tanks (indicate type of material stored e.g. fuel, gas, water, etc.)
3. Sewage disposal works details
4. Chimneys (substantial)

ROAD FURNITURE (IN CASE OF EXISTING ROAD)

1. km post (value to be noted).
2. Bus stop facilities.
3. Traffic signal posts and controllers.
6. Road signs.

BOUNDARY FEATURES

1. Gates.
2. Boundary stones located/used for fieldwork.
4. Walls.
5. Burial grounds.
6. Historical areas.

RAILWAYS

3. Gauge faces of railway running rails with elevations of rail top.
4. Level crossings.
5. Platforms.
6. Bridges (over road, river, etc.).
7. Station building.
8. Telegraph poles (indicate the reference numbers).

SURVEY

1. Survey Department Trigonometric Stations.
2. Permanent Ground Markers (IP's, RM's, TBM's, etc).
3. Survey Department Benchmarks used (Indicate reference number and level).

WOODS, TREES & RECREATION AREAS

1. Playing field.
2. Land-use and vegetation, etc.
3. In case of trees in the survey corridor, the surveyor has to assign a code defining the girth of the tree. Trees with varying girth as specified in the CSR for payment shall be in respective layers.

SLOPES AND EARTHWORKS

1. Cutting and embankments with any protection work done.

2. Terraced slopes.
3. Borrow pits / Quarries.
4. Retaining wall.
5. Indicate date of survey if on-going earthworks is present and mark the affected area.

SERVICES AND UTILITIES

1. Transformers (boundary fences only).
2. Electricity sub-stations and switch boxes (boundary fences only).
3. Pylon lines (indicate levels at lowest point at sag and at pylon towers).
4. Pylon bases.
5. Pylon reference numbers and voltage of transmission.
6. Radio, TV station masts or towers.
7. Telecom poles.
8. Electricity poles.
9. Water mains pipes and stop valves (Indicate diameter of pipe).
10. Manholes (circular and square).

WATER & DRAINAGE

1. Lakes
2. Ponds or mining pools
3. Reservoirs
4. Rivers (name to be indicated)
5. Streams
6. Ditches (width to be indicated)
7. Canals
8. Wells (diameter or width to be indicated)
9. Swamps
10. Lined drains (width, depth and type to be indicate)
11. Water towers
12. Culverts
13. Waterfalls
14. Jetties (if any)
15. The top of banks of all water features over 1.0 meter wide shall be detailed and the bottom of banks as indicated by the water level at the time of the survey. The direction of flow of all river, streams and watercourses shall be indicated.
16. Slopes with height greater than 1.0 meter of too sharp gradient to be shown by contours, including river and stream banks are to be shown on conventional markings and the top and bottom of slopes are to be shown as dotted lines.
17. Slope conventions shall be drawn as near as possible to indicate the actual shape of the slope face, i.e., all berms and terraces shall be detailed.

Any other features not listed, which are requested by the Client shall also be shown.

4.3.9 SPOT HEIGHT

4.3.9.1 Spot heights shall be shown on the final drawings at spacing not exceeding 20 m at the following locations:-

- At salient points such as hilltops, bottoms of depressions and saddles.
- Along the center and edges of all roads and public accesses, at road intersections and significant changes of gradient.
- At water level at the time of survey along river, streams, major watercourses and ditches.
- On bed levels of rivers, streams, canals and other watercourses.

In flat areas, where the horizontal distance between contours generally exceeds 40 m Supplementary spot Height shall be shown at intervals not exceeding 20 m parallel to the contours.

4.3.10 BRIDGE DETAILS

The bridge details shall be shown on a separate drawing for each bridge (see **Annexure T2**).

The bridge observations in form of coordinates shall include the following:-

a) The coordinates and levels of the four corners of the bridge (points shall be on the adjacent road surface), the two edges of the piers, abutment and wing walls.

b) The coordinates and levels of the bridge deck to the intermediate piers (if any) of the bridge.

c) Length, width and type of construction of bridge.

d) The type and location of services adjacent to the bridge.

e) The coordinates and levels of the centerline and the road on the bridge at approximate intervals of 5 m.

f) The cross-sectional clearance envelope at the two sides of an overpass bridge (with respect to the road centerline passing underneath) showing all the relevant levels, offsets and skew angle.

CULVERT DETAILS

Details of each culvert are to be shown on the survey plans and a separate sheet (annexure-c) tabulation of the following information is to be submitted with the plans:-

a) Type of culvert and diameter.

b) Chainage of culvert at the road centerline.

c) Skew angle of the culvert from the centerline.

d) Length of culvert from each side of the centerline.

e) Invert levels of the inlet and outlet.

f) A sketch of the inlet and outlet structures including all visible dimensions to a scale of 1:200.

For major culverts (dia.>2.0m) the outlet structures are to be properly measured enough points shall be recorded so that the culvert can be modeled in CAD.

In case alignment runs along the existing road, sufficient points should be taken across the existing road to fully define the cross-section. Below are **minimum** points shown for the existing road way cross-section. For the existing carriageway, the width of carriageway, inner and outer shoulders should be clearly identified and coded.

Existing Road/embankment

4.3.11 DETAILS OF JUNCTIONS AND EXISTING ROADS

The Surveyor shall survey all junctions to enable the designer to design the junction properly. A corridor width of 70m and shall be taken for a distance of not less than 150 meters up and down the proposed intersection of the road or as required by the client.

All paved roads, main roads and footpaths or tracks having the width greater than 2m shall have a minimum of two (2) points defining both edges of the carriageways. Consecutive points along the road feature shall not exceed 20m in rural areas and 10m in urban or built-up areas. More points are generally needed to define curved feature such as slip roads, islands, etc.

Levels of the road centerline shall be recorded for paved roads having widths greater than 6.0m. The main destination of the road from the junction shall be recorded by the Surveyor.

Where necessary to survey along an existing road, the Surveyor shall follow the marked chainages along the centerline. In addition to the road edges consecutive points along the edges of the carriageway (i.e. along the edge line marking on both sides) shall be picked up and shall not exceed 10 m. More points are generally to define super-elevation changes at curve sections.

5.1 Digital Ground Models (DGM)

The product of the filed survey data, after processing shall be DGM. The accuracy of DGM shall depend upon the accuracy of the digital data collected in the field. All survey feature lines will herein be referred as 'strings'. The data shall be presented by the Surveyor in a form suitable for input to the software to be used for generation of DGM. .. The models shall consist of three dimensional (3D) contour strings.

The existing road surface over the required area shall be simulated by 3D strings of coordinated information along characteristic lines on the existing carriageway. Any other strings that do not affect the accuracy of the ground surface may be assigned a null level.

TIN (Triangular irregular network) shall be developed by using software. Using TIN, Contour generation shall be done. Since the NHA uses Eagle Point for vetting, same shall be used by the Consultants.

5.2 Grid

The coordinates of the DGM shall be referred to the grid system as described in the Section 4.3.7. The coordinates of the DGM shall be in Easting, Northing and elevations.

5.3 String Labeling

The ground features including break lines shall be labeled with the exact description shown under AUTOCAD LAYER NAME. Any additional labels may be considered and the Surveyor shall submit the list for approval prior to their usage in the DGM.

5.4 Property Model

This model shall be stimulated by a series of 3D null level strings and text strings and includes the following:-

a) Strings of land lots (null level strings)
b) Land use and type (Text Strings)

Attributes to land type and use shall be appended to in the AutoCAD format. Such information shall be used by the Surveyor when preparing Land Utility folders at the end.

5.5 Contours

After digital data collection of survey points at site, the contour generation shall be done by using computer software. The interval shall be 1 m. The smoothness factor to be defined in the software should be such that it should not distort the ground contour representation. The contours should be well labeled.

Contours shall be shown by continuous lines with a thicker line for every fifth contour (Prominent Contour). Contour and spot heights shall be differentiated from other detail. The value of each contour shall be indicated along the contours at intervals not exceeding 200 mm and / or the edges of the Mapping area.

5.6 Longitudinal Profile and Cross-Section

The longitudinal profile plan shall be plotted in A1/A3 size (as requested by Client) to a scale of 1:1000 Horizontal and 1:100 Vertical with chainage interval of 25 m unless otherwise specified or instructed by the Client. The cross sectional plan of the existing road shall be plotted in A1 size to a scale of 1:200 both horizontal and vertical with 25 m interval. The plan shall show the chainage interval as specified and the existing ground profile and all the existing features.

5.7 Submission of Survey Report and Drawings

Survey report shall be prepared and submitted giving details of the work carried out and results obtained. A detailed inventory of existing features (pertaining to road works and structures) along the proposed road like guard rails, barriers, culverts, cat eyes, road markings etc. shall be separately prepared on topographic survey drawings

The Surveyor shall supply the digital ground model data, All Drawings, Reports suitable for input to the computer The CD-R and hard copy shall be supplied with an index scheduling the contents and referencing and shall remain the property of the Client.

5.8 Field Books and Record

All field books and computer data must be properly kept and shall record truthfully all the survey work carried out. Unsatisfactory works and errors shall be struck off and there shall be no superimposed writing or erasure.

The Surveyor shall submit the required number of copies of Final Survey Report on completion of all survey works in a format as approved by the client. All photographs for all the copies shall be original copies and any diagrams or plans presented together with the report shall be in a clean and neat form and in scanned soft format.

Task 4:	**Traffic & Axle Load Survey**
Outcome:	**Classified Traffic Surveys after approval of Client.** **Submit Traffic & Axle load survey report**

6.1 Traffic Count

Traffic count forms the basis for capacity analysis, pavement design and economic analysis etc. Consultants is required to carry out classified traffic counts at required locations along the project and on the connected network to develop an understanding of traffic pattern. The study will also entail the estimation of diversion and generated traffic. The Consultants shall submit in Inception report, detailed program of traffic count along with locations, duration and repetitions. Same shall be exercised after the approval of the Client.

6.1.1 JOURNEY TIME

For with and without Project scenario, the journey time survey of various classes of vehicles in peak hours and off peak hours shall be done. It shall be used in economic analysis

6.1.2 ORIGIN & DESTINATION SURVEY

If required, the O&D Survey shall be carried out to identify the traffic like to be diverted to the Bypass.

6.1.3 Axle Load Survey

Consultants shall undertake axle load survey using portable weighing machine. Consultants shall confirm in his technical proposal the availability of such equipment (ownership / rental basis). Sufficient samples of all axle groups shall be weighed. In addition to axle load, tyre pressure shall also be measured. Data shall be annexed in the final report and used in the pavement design.

6.2 Traffic Diversion Plans

Traffic Diversion Plans shall be provided for the following situations:

a. At toll plazas

b. At Intersections

c. In urban areas including methodology for separating the local and through traffic.

d. On at-grade railway crossings.

e. At places where underground construction like construction of box culverts proper traffic diversion plans shall be provided.

f. At places where overhead bridge construction is likely to take place, proper traffic diversion plans shall be provided.

Consultants shall fully define the methodology for construction sequence, diverting traffic and maintaining the diversion roads. A separate bill is to be developed for construction/maintenance of diversion roads. (Consultants should state the exact scope of work in the Inception Report).

Task 5:	**Soil & Material Investigation Report**
Approximate Duration:	**30 Days**
Outcome:	**Soil and Material Investigation Report**

7.1 Soil & Material Investigation

Soil & Material is shall be done to ascertain the index and engineering properties of soil & rock encountered. The Consultants is required to seek, interpret and evaluate subsurface and surface data in order to predict the behavior of the soils and materials along, and adjacent to, the alignment. The resulting information should be presented in a logical and intelligible manner so that it can be used correctly and efficiently by the non specialist.

The Consultants is required to carry out following steps:

- Determine needs of the design
- Carry out complete ground investigations
- Carry out complete laboratory testing
- Evaluate results for final design

As per fixed horizontal and vertical alignment, identify the areas of deep cuts and high fills. Study precise geometry of the roadway structures and develop design requirements.

Field investigations shall be carried out in three main areas.

- Investigation along the length of the proposed alignment and to determine the pavement support potential offered by the subgrade soils
- Investigation to determine the source and quantity of naturally-occurring construction materials
- Examine specific sites such as deep cuts, retaining walls and culverts etc.

For testing of materials, following codes and standards shall be followed:

a) ASTM - American Society for Testing & Materials.

b) AASHTO - American Association of State Highway and Transportation Officials.

Task 6:	**Material Investigation and Construction Material Report**
Outcome:	**Material Investigation and Construction Material Report**

8.1.1 Material Investigation

Every effort should be made to locate sufficient quantities of naturally occurring construction materials at regular intervals along the alignment and as close to the alignment as possible. In case of potential quarry sites, test borings are likely to be necessary to confirm the quantity and quality of material available. Bulk samples for quality testing may be obtained from adjoining bedrock outcrops provided that the samples obtained from such sources are truly representative. Test results from any nearby operational quarries should also be included.

The material to be investigated include but not limited to, earthwork, subbase, aggregate base, asphaltic material, cement, steel, pre-stressing strands, sand, crush aggregates and geo-textile etc.

Considerable amount of water is likely to be required for the proper compaction of earthworks, and water points will be necessary at frequent intervals along the alignment. An assessment should be made of the likely sources of water from any existing wells and from the geological formations underlying the route. Samples for tests to assess the suitability of water for concrete will be necessary.

8.2 Evaluation of Existing Pavement

In case of rehabilitation of existing pavement is required, the Consultants shall prepare a separate report, stating the functional and structural capacity of the existing pavement. In case of functional capacity, the present IRI, Capacity, drainage shall be reported. For Structural Capacity, FWD data shall be provided by NHA. Consultants will analyze the data and based on unit delineation with coefficient of uniformity of not greater than 15%, homogenous sections shall be developed. Consultants shall develop a destructive testing program to obtain in-situ parameters like, compaction, moisture density, gradation, insitu-CBR and layer thicknesses. With all the data, back calculation exercise shall be done to arrive at available strength, to be used in the pavement design.

A visual survey inventory of road with photographs shall be attached in the NHA's standard Performa for visual survey inventory of road.

Task 7:	**Geotechnical Investigations for structures**
Outcome:	**Geotechnical Investigation Report**

8.3 Geotechnical Investigation for Structures

Consultants shall appoint, after the approval of the Employer, a "Nominated Specialist Contractor" to perform geotechnical investigations including field and laboratory testing, for which a provisional sum of Rs. 2,000,000/- maximum (Rupees two million only) has been kept. After the formulation of exact scope of work for sub–surface investigations based on

reconnaissance survey by the Consultants and subsequent approval of NHA, at least three **sealed** quotations from reputed Geotech firms shall be called by the Consultants and submitted to NHA for nomination of selected contractor, where after work shall commence on site based upon a formal agreement between the Consultants and contractor (including quantities, rates and work schedule). The Employer would pay the fee for this work agreed between both parties directly to the nominated specialist contractor after certification of work by the concerned Deputy Director (Maintenance) NHA and invoiced by the Consultants. Consultants will supervise the sub soil investigation work to be carried out by Geotechnical Firm.

Sub–surface investigations consisting of boreholes / drill holes / test pits of required depth, supplemented by field and laboratory testing to accurately assess the engineering properties of the underlying soil strata for detailed design of foundations, substructures and roads shall be undertaken. A separate report will be prepared to this effect and will be submitted to NHA for approval. Original lab reports shall be attached in the soil report along with colored photographs.

Bore logs shall be included in the Soil Investigation Report along with the laboratory results. Testing of samples collected from site shall be carried out in a reputed laboratory, under strict quality control and adherence to relevant ASTM procedures / standards. Depth of boring shall be decided by the geological formation at site and the type of foundations proposed for the structures. Standard penetration tests shall be started from the ground surface and carried out in accordance with ASTM D1586 Penetration Test and Split Barrel sampling of soils. Where clayey soils are encountered, undisturbed samples shall be obtained in accordance with ASTM thin–walled sampling of soils.

Submission of proper site investigation report comprising all relevant notes and pertinent information required by this Specification together with laboratory test results. The above scope of work may be varied or deleted depending on the findings as the investigation proceeds. All Sections in this Specification and the Bill of Quantities, which relate to work or materials not required shall be deemed not to apply.

A visual survey inventory of road with photographs shall be attached in the NHA's standard performa for visual survey inventory of road.

Task 8:	**Pavement Design Report**
Outcome:	**Pavement Design Report**

8.3 Pavement Design Report

After the traffic count and projections for designed life of 10 years are done, the soil investigations data is available; the pavement design shall be done. The Consultants shall get the basic design from AASHTO Pavement Design Guide-93, but final pavement design shall be done using empirical-mechanistic method. Asphalt Institute & Shell Model shall be used. Axle Load data and tyre pressure data collected under Para 7.1.3 shall be used. All calculations shall be attached in the report.

Flexible, Rigid and Composite Pavement shall be evaluated and cost comparison shall also be carried out.

Task 9:	**Hydrologic Study**
Outcome:	**Hydrologic Report**

9.1 Hydrology & Hydraulic Study

The hydrologic analysis performed on each Project shall be compiled in a hydrologic report. The Report shall consist of two sections; a data section, where the hydrological background information shall be recorded. Other part shall be an analysis section, where the design computations shall be recorded.

The following items shall be used as a checklist of the data that shall be included in the hydrological report. The comprehensiveness of the report shall depend upon the nature of the valley, or flood plain to be traversed, the cost of proposed drainage structures, and class of highway.

9.1.1 HYDROLOGICAL DATA

The Project road almost runs across the District. It is highly likely that the Roadway shall have to be designed to withstand the flood impact as well as enough openings need to be provided to mitigate the ponding of water and further damaging the human settlements. Part of the Project road is highly affected by the River Ravi Spill.

Conventional hydraulic impact using empirical connotations are not warranted, as they do not depict the real impact of food and flood routing in extreme flat land of Punjab. Our consultants generally follow such practices and are devoid of modern techniques employed using DEM and aerial photographic techniques. It is strongly suggested to undertake the state of the art methodology with ground validation of land use and drainage patterns. The main scope of the required study is as follows:

(a) Field Work and GIS data Processing

i. Reconnaissance survey, literature review and marking of waterways.
ii. Calibration of field data with remote-sensing data.
iii. Satellite Imagery and DEM processing.
iv. Land use and Soil Mapping with ground verification.
v. Flood routing investigation.

(b) Hydrology and Hydraulic study

i. Watershed delineation
ii. Soil and land use analysis.
iii. Rainfall analysis
iv. Storm-frequency analysis
v. Design Storm calculation
vi. Surface runoff model
vii. 2D Hydraulic River & flood modeling for embankment height and structures design and value engineering

(c) Hydraulic design of cross drainage structure

Above methodology is robust and predict accurate water shed pattern. The DEM used is refined to the extent to give acceptable results. It is highlighted that the whole design philosophy in such conditions are dictated by the Hydrology/ Hydraulic study.

Task 10:	**Environmental Impact Assessment**
Outcome:	**EIA Report Submission and obtaining NOC from PEPA**

10.0 Environmental Impact Assessment

As per EIA Rules, Consultants is required to carry out the EIA Study as per scope of work in Chapter-4 of Appendix-A. It involves collection of required base line data from site, analysis and recommendation for mitigations. Findings shall be recorded in formulation of Report, getting it reviewed from NHA EALS Section. Submission of EIA Report to EPA Punjab, addressing their requirements, to their entire satisfaction (Including submission fee). Conducting the Field hearing and obtaining NOC for NHA. All costs whatsoever shall be quoted.

For EIA, Consultants shall directly coordinate with GM (EALS) office under intimation to this office. The Consultancy fee against the EIA shall be verified and Processed by the office of GM (EALS).

Task 11:	**Highway Safety Audit**
Outcome:	**Highway Safety Audit Report**

11.0 Highway Safety Audit (HSA)

Pakistan is among those countries, where the road accidents and fatalities are high. One of the major components 28% relating to road accidents is attributed to the road environment factors. It is therefore essential that the highway safety audit should be carried out by a certified Expert, at various stages, as per requirements of international standards. These stages are outlined below:

- Feasibility Audit
- Preliminary Design Audit
- Detailed Design Audit
- Pre-opening Audit

Presently, NHA has its own in-house Highway Safety Audit (HSA) Expert. He will conduct Highway Safety Audit while the Consultants will appropriately address his comments in the detailed design up to his complete satisfaction. The Preliminary Audit shall be carried out, after the preliminary design is completed. Auditor shall conduct meeting with the design Consultants. Consultants is required to extend full cooperation in discussion, providing answers to queries and supply of all data and drawings/reports required.

Detailed Audit shall be carried out after the detailed design is completed. The Auditor may opt for site visit if required. Consultants shall provide necessary support in form of

alignment identification (Surveyor will accompany). Meetings shall be arranged with the design team of the Consultants.

Task 12:	**Technical and Economic Feasibility Studies**
Outcome:	**Feasibility Study Report**

12.1 Technical and Economic Feasibility Studies

Consultants shall prepare a comprehensive Feasibility Study Report which shall cover following aspects for the Expressway section:

i. Technical part;
ii. Financial & Economics part.

Scope of services required to be covered under each Part is elaborated under respective headings in the above paragraphs. However, the Technical area shall cover all the activities under clause 'H' i.e. scope of work. All tasks shall be wisely covered in the feasibility Report.

In the Economics part, Consultants shall elaborate the Benefit cost ratio, net present value, and economic internal rate of return, sensitivity analysis and recommendations. Following tasks shall be carried out by the Consultants for feasibility study of subject sections:

- Update available data on vehicle operating costs (VOC) for various types of vehicles, and develop cost estimates. To be effective in guiding the Consultants in preparing cost-effective designs, the economics analysis should be undertaken concurrently with the design, using preliminary cost estimate, where necessary.

  Following the decision on the design and preparation of the finalized engineer's cost estimates, the economics analysis can be refined and finalized.

- Calculate economic savings in vehicle operating cost, travel time and accident cost savings over a 20 year analysis period due to the proposed works. Also include savings in Highway Maintenance due to improved conditions for the road sections and the project as a whole. The Consultants may use the Highway Design and Maintenance standards Model (HDM-4) with congestion analysis routine, or equivalent analysis software for this task.

- Estimate the return on the investment in terms of net present value (NPV), economics internal rate of return (EIRR), and ratio of benefits to cost for each of the road sections and the project as a whole.

- Perform sensitivity analysis and switching value study to assess the likely effects of project risks (such as implementations delay, cost increase, benefits decrease, etc) and uncertainties on economic indicators. The report shall present, at least for the project as a whole, the annual benefit and cost streams and EIRR/NPV in a spreadsheet format.

- The Consultants shall also study the national and regional economic developments, and estimate benefits of the project section on the economy at national and regional level.

Task 13:	**Stakeout of Design Alignment**
Outcome:	**Centerline staked out at site with permanent markers**

13.1 Stake of Alignment on Ground

After the Design drawings are approved, the Consultants shall be asked to stake the alignment on ground. The Centreline markers shall be fixed on ground at 100 m interval. A 1.5 m long "Bamboo stick" with orange colour cloth 1m x 0.5 m shall be fixed at each point. The alignment shall be shown to the NHA CDC, HQ.

Alignment shall be approved on ground. In case of any re-alignments proposed, the Consultants shall carryout without any additional cost.

Task 14:	**Land Acquisition & Utility Folders**
Outcome:	**Land Acquisition & Utility Folders**

13.2 Land Acquisition and Utility Infrastructure Report

The Consultants shall identify land and property falling in the right of way (ROW) to be acquired, if available. The Consultants shall submit ROW plans showing the alignment with 5 copies thereof to NHA to facilitate timely action for acquisition of land to define the right of way. ROW permanent markers shall be set up by the Consultants, upon request. The cost is to be included in the bid under this heading. The Consultants shall also prepare estimate for acquiring any additional and removal of structures and utilities, particularly in the built up areas. Folders shall be submitted in soft format in CAD with reference to grid coordinates.

Alignment shall be approved on ground. In case of any re-alignments proposed, the Consultants shall carryout without any additional cost.

Task 15:	**Construction Machinery Report**
Outcome:	**Construction Machinery Report**

14.1 Construction Machinery Report

A detailed report on construction resource shall be prepared. It will include, based on the construction duration, the amount and type of construction machinery required. Based on the Construction plan developed in Primavera/Microsoft Project, the resource allocation/ the Cash flow required shall be stated. Computations and assumptions for productions shall be attached in the report. The cost of any equipment required to be imported shall be reflected in the foreign currency portions of the cost estimates and PC-I.

Task 16:	**Formulation of PC-I**
Outcome:	**Submission of PC-I**

15. Formulation of PC-I

The Consultants shall prepare PC-I for the project road sections including economic analysis on prescribed proforma of PC-I by Planning Commission.

Separate PC-I for land acquisition shall be prepared and submitted.

Task 17:	**Tender Documents**
Outcome:	**Submission of Tender Documents**

16.1 Tender Documents

TENDER DOCUMENTS

Tender Documents shall comprise of the following:-

a. Volume-I

- Instructions to Bidders.
- Conditions of Contract (Part-I) (General Conditions)
- Conditions of Contract (Part-II), (Conditions of Particular Application).
- Conditions of Contract (Part-III), (Supplementary Conditions)
- Forms and Appendices

b. Volume-II

- General Specifications.

c. Volume-III

- Particular Specifications, Special Provisions and Bills of Quantities.

d. Volume-IV

- Drawings as per the following detail:
- Title Sheet
- Sheet Index
- Key & Location Plan with Co-ordinates and alignment with stationing. Pits of soil investigations shall also be marked.
- Sheet of Legends & Symbols
- Traverse, Bench Mark and Design alignment data including curve data
- Typical Cross-Sections with locations of applications
- Super-elevation details and Linear Plan
- Road Furniture Details (Guard rails, Pavement Markings & Traffic signs etc)
- For Road furniture, location tables
- Retaining walls with location tables

- Soil investigation linear plan
- Intersection Details
- Drainage plan for surface runoff and urban areas
- Mass Haul Diagram
- Plan and Profile Drawings
- General Notes for Structural Drawings
- Drawings for Small drainage structures
- Drawings for Large structures
- Drawings for earth retaining structures
- Design of Toll Plaza
- Landscaping details
- Miscellaneous Details/ Ancillary Works including training works.
- Detail drawing folders of Utilities/Infrastructure for Land Acquisition and removal of all utilities/ infrastructure etc., having all the requisite information.
- Detailed design calculations for all the relevant structures (Excel sheets, models, hard copies)

NHA has standardised Volume-I (Part-I) and Volume-II. Consultants shall study and adopt these documents after careful scrutiny and modification wherever required.

e. Contract Conditions (Legal Part)

NHA has prepared Standard Tender Documents sections on instructions to Bidders. Conditions of Contract, Bid Forms etc. and has used them for similar project in the past. Consultants shall study these standardised contract conditions and amend them in accordance with the requirements of this project. The Special Conditions of Contract can be added pertaining to the project as supplement to the General Conditions of Contract.

f. Technical Specifications

The Consultants shall study the NHA Specifications and prepare particular specification for the project for specified items not covered in the General Specifications.

g. Bill of Quantities

Consultants shall prepare comprehensive Bill of Quantities to be calculated to accuracy of ± 5% encompassing all the items of work, properly cross referenced to the Technical Specifications. Standard format of Bill of Quantities shall be adopted.

h. Construction Drawings

The Consultants shall prepare construction drawings (Contract Plans) in a clear, concise and uniform manner in Digital Format using AutoCAD. The drawings shall be A1/A3 size. Scale for horizontal alignment shall be 1:1000 and for vertical shall

be 1:100. All drawings shall be signed in original. For draft submissions, the Consultants shall stamp on every page Draft 1, 2, until final submission is made. On final submission, the stamp "Final Tender Drawings" shall be printed on every page with signatures. At the end of drawings a jacket containing CD shall be placed, in which the soft copy of drawings with all drawings in AutoCAD format. For every drawing shall be made ready in layout mode. Not fulfilling these requirements will result in returning of drawings as un-acceptable.

i. Engineer's Estimate

Consultants shall prepare the Engineer's Estimate of the project based on the detailed design, drawings and final Bill of Quantities, using NHA latest Schedule of Rates. Total project value based on fair local market prices, materials, work methodology, machinery and equipment required and on the basis of 90% management efficiency shall also be worked out. For items not specified in NHA **CSR**, rate analysis shall be provided based on market price.

Note: The following shall also be submitted/ provided by the design Consultants as an integral part of the Bill of Quantities/Engineer's Estimate:

i. Complete BOQ take off sheets
ii. Bar Bending Schedule(s)
iii. "C" Factor Backup Calculations
iv. Non-CSR item Rate Analysis
v. Special Provisions (SP) item Specifications
vi. Consultants is required to provide all the submissions with each and every paper properly signed and stamped.

17.0 Final Presentation

Consultants at the end of design shall make a final presentation with following details. At the end of Presentation, on box containing all documents and drawings shall be handed over for record section.

Important Features of Presentation:

1- Consultants will describe the selected road alignment, merits, demerits, land acquisition and other impediments (if any).

2- Consultants will highlight important components of project like major bridges, flyovers, interchanges service areas and landslides etc.

3- Important parameters of sub-soil investigation like CBR, Pile Capacity and General Soil Classification etc.

4- Consultants will also highlight the environmental impact of the road construction on the road influence areas.

5- Important hydraulic parameters used in the design of bridges over rivers/ canals.

6- Results of traffic study and axle load survey.

7- Location of quarry sites

8- Consultants shall clearly explain the traffic management plans.

9- Complete description of design criteria and functional requirements.

10- Description of specialised equipment and machinery required for the construction.

11- Description of methodology/ codes for pavement and structural design including details of computer models.

12- For Structural Design, Summary of results of computer output (especially maximum and minimum forces for all elements) in tabulated form shall be presented.

13- A plan showing major quarry sites/ borrow area sites including mass diagram showing cut and fill along the finally selected alignment shall be presented.

14- Any other points, which the Consultants may like to highlight, should be included.

18.1 Submission of Documents

All the Reports associated with each Task shall be submitted as stated in respective sections. However stage wise list of submissions is attached at **Annexure T1. In the technical proposal, Consultants shall develop a Work programme task wise with submission dates. Failing to provide the same, the proposal shall not be evaluated.**

All documents/ drawings shall be subject to review and checking by NHA's Experts. Consultants will incorporate any comments/ modifications made by the Experts (if agreed, The Responsibility for correctness of design lies with the Consultants).

Consultants will provide two additional sets of the tender documents and reports to the Client at a later stage at no extra cost to the Client. Additional number of sets (if required) shall be provided at a cost of Rs.5,000/- per set.

18.2 Provision of Data on Compact Discs

The Consultants shall submit complete set of documents and drawings listed above on three (03) digital CD-ROMs. Files (Word, Excel, AutoCAD, Graphical Images, Photographs and Software Models etc.) shall be properly indexed/ catalogued for record purposes and use/ reproduction at a later stage by NHA.

19.0 Performance of the Consultant

The Consultants shall attend the pre-bid meeting and his performance with reference to the queries of the contractors shall be evaluated and recorded by GM (P&CA) & GM (Design).

a. During the construction phase, the design review shall finally reveal the performance status recorded by the Design Section.

b. Finally the performance of the Consultants shall be evaluated based on the performance status recorded by the Design Section.

The performance rating shall be made in the following manner:-

• A+	Excellent
• A	Good
• B	Requiring improvement
• Poor	Poor

c. "B" performance rating without subsequent improvement shall drop the Consultants performance to the stage "Poor". If "Poor" persists in two consecutive stages, the Design section shall propose penalty and P&CA shall implement the recommendation in the light of legality of the matter.

20.0 Mode of Payment:

"A" will be worked out by subtracting total amount of all the Provisional Sum items in Appendix-E to the Contract Agreement from the Contract Price.

S. No.	Description	% age of 'A'
STAGE-I		
1.	Inception Report	5%
2.	Reconnaissance survey and Alignment study and recommendation for realigned portion	5%
3.	Technical and Financial Feasibility Report	5%
	Sub Total (A):	**15%**
STAGE-II		
1.	Topographic survey Report	5%
2.	Traffic and Axle load survey report	5%
3.	Soil And Material Investigation report	5%
4.	Hydrology and hydraulic study report	5%
5.	Pavement Design Construction Machinery Report	5%
6.	Construction machinery report	5%
7.	Highway Safety Audit Report	5%
8.	Land Acquisition & relocation of Utility Infrastructure Folders and ROW Plans showing the alignment and total area to be acquired, if required	5%
9.	Structure condition report, structure design report and calculations	5%
10.	EIA and SIA Report	5%
	Sub Total (B):	**50%**

S. No.	Description	% age of 'A'
STAGE-III		
1.	Final Tender Documents including Design of road furniture, traffic signs, horticulture and landscaping of intersection, mass–haul diagrams	10%
2.	Final Design Report (including detailed Structural and Pavement Design Backup calculations)	5%
3.	Engineers Estimate as per latest CSR along with backup of quantities	5%
4.	Draft PC-1	5%
5.	Final PC-I	5%
6.	Traffic Management Plan	5%
	Sub Total (C):	**35%**
	T OT A L (A+B+C)	**100%**

Notes:

1- Upon submission of Reports, 50% payment shall be released if the report is acceptable to the Client. Remaining shall be released upon acceptable quality is ensured. Upon initial submission, a checklist correlating to TOR requirements shall be attached and checked for requirement spelled out.

2- Final payment shall not be cleared until formality of Clause 18.1 & 18.2 is ensured and Consultants gives an undertaking that all drawings in editable format and reports in word and excel format is submitted.

Annexure-T1

DELIVERABLES
(Breakdown)

All the Reports associated with each Task shall be submitted as stated in respective sections. In the technical proposal, Consultants shall develop a Work Program Task wise with submission dates. Failing to provide the same, the proposal shall not be evaluated. However list of documents to be submitted by the Consultants is hereunder:

STAGE-I (FEASIBILITY STAGE):

S. No.	Description	Stage wise List Of Submissions
i.	Inception Report	05 Hard + 01 Soft Copy
ii.	Alignment Study and recommendations for realigned portion	05Hard + 01 Soft Copy
iii.	Final Technical and Economic Feasibility Report	05Hard + 01 Soft Copy

Note: **Stage II and Stage III will be undertaken after the approval of Stage I. The soft copy will also be submitted in the format compatible with document i.e. Word, Excel, CAD, etc. One copy in PDF must be provided along with.**

STAGE-II (DETAILED DESIGN):

S. No.	Description	Quantity
i.	Report on condition survey of pavement & structures	05Hard + 01 Soft Copy
ii.	Pavement & Structural Design Report	05Hard + 01 Soft Copy
iii.	Soil and Material Investigation report	05Hard + 01 Soft Copy
iv.	Hydraulic and Hydrology study Report	05Hard + 01 Soft Copy
v.	Pavement Design Report	05Hard + 01 Soft Copy
vi.	Land Acquisition & Utility Folders	05Hard + 01 Soft Copy
vii.	ROW Plans showing the alignment	05Hard + 01 Soft Copy
viii.	Construction Machinery Report	05Hard + 01 Soft Copy
ix.	Detailed Structural/Pavement/quantities calculation	05Hard + 01 Soft Copy
x.	EIA and SIA Report	05Hard + 01 Soft Copy

STAGE-III

S. No.	Description	Quantity
i.	Final Tender Documents and Engineers Estimates	10 Hard + 01 Soft Copy
ii.	Final Design Report (including detailed Structural/Pavement/quantities calculations)	10 Hard + Soft Copy

iii.	Report on Placement of ROW markers	05 Hard + 01 Soft Copy
iv.	PC-I Performa	80 Hard Copies
v.	C-factor along with back up calculations	05 Hard Copies
vi.	Traffic Management Plan	05 Hard Copies

Annexure T2

Following Bridges items but not limited to, needs to be checked:

1. Approaches

a. Condition of pavement surface (report unevenness settlement, cracking, pot holes, etc.)

b. Side slopes (report pitched or un-pitched, condition of pitching/turfing any signs of slope failure, etc.)

c. Erosion of embankment by rain cuts or any other damage to embankment

d. Approach slab (report settlement, cracks, movement, etc)

e. Approach geometrics (report whether it satisfies the standards as in force)

2. Protective Works

a. Type (mention whether guide-bunds or protection around abutments or spurs).

b. Report damage of the layout, cross-section profile (check whether the layout and the cross section are in order).

c. Report condition of slope pitching, apron and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slope, width and thickness of apron, erosion of toe walls, etc.)

d. Report condition of floor protection works, indicate nature of damage if any (condition of impervious floor, flexible apron, curtain walls, etc.)

e. Extent of scour (report any abnormal scour)

3. Waterway

a. Report presence of obstruction, undergrowth, etc.

b. Report maximum observed scour and location and compare with the design values.

c. Report any abnormal change in flow pattern

d. Report maximum flood level observed and mark the same on the pier/abutment both on the U/S and D/S.

e. Report abnormal afflux if any

f. Report adequacy of waterway

4. Foundations

a. Report settlement, if any

b. Report cracking, disintegration, decay, erosion, cavitation, etc.

c. Report damage due to impact of floating bodies, boulders, etc.

d. For subways report seepage if any, damage to the foundations, etc.

5. Substructure (piers, abutments and wingwalls)

a. Report efficiency of drainage of the backfill behind abutments (check functioning of weep holes, evidence of moisture on abutment faces, etc.)

b. Report cracking, disintegration, etc.

c. For subways report condition of side retaining walls like cracking, disintegration, etc. and seepage, if any

6. Bearings

a. Metallic bearings

1) Report general condition (check rusting, cleanliness, seizing of plates)
2) Functioning (report excessive movement, tilting, jumping off guides)
3) Greasing/oil bath (report date of last greasing/oil bath and whether to be redone or not)
4) Report cracks in supporting member (abutment cap, pier cap, pedestal)
5) Report effectiveness of anchor bolts (check whether they are in position and tight)

b. Elastomeric bearings

1) Report condition of pads (oxidation, creep, flattening, bulging, splitting)
2) Report general cleanliness

c. Concrete bearings

1) Report any signs of distress (cracking, spalling, disintegrating)
2) Report any excessive tilting

7. Superstructure

a. Reinforced concrete and pre-stressed concrete members

1) Report spalling, disintegration or honey-combing, etc.
2) Report cracking (pattern, location, explain preferably by plotting on sketch)
3) Report corrosion of reinforcements if any
4) Report damages if any due to moving vehicles
5) Report condition of articulation (cracks if any)
6) Report perceptible vibration, if any
7) Report excessive deflections or loss of camber if any (measure at same point each time)
8) Report cracks in end anchorage zone (for pre-stressed concrete members)
9) Report deflection at central hinge, tip of cantilever for cantilever bridges

b. Steel members

1) Report condition of paint
2) Report corrosion if any

3) Report perceptible vibrations, if any
4) Report on alignment of members
5) Report condition of connection (adequacy, looseness of rivets, bolts or worn out welds, report especially on connection of stringers, to cross girders, cross girders to main girders, gussets or splices, etc.)
6) Report camber and deflection
7) Report buckling, if any
8) Report on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)

c. Masonry arches

1) Report condition of joints mortar, pointing masonry, etc.
2) Profile report flattening by observing rise of the arch at center and quarter points
3) Report cracks if any (indicate location, pattern, extent, depth explain by sketches)
4) Check drainage of spandrel fillings (report bulging of spandrel walls if any)
5) Check growth of vegetation

d. Timber members

1) Report condition of paint
2) Check decay, wear and tear, structural defects needing immediate replacement, if any
3) Report condition of joints, splices, spikes, etc.
4) Report excessive sag, if any

e. Suspension bridges

1) Report condition of cables
2) Report condition of suspenders and their connectors
3) Report condition of structural steel
4) Report condition of painting
5) Report excessive oscillations if any requiring need of guy ropes
6) Report looseness of joints, bolts, rivets, welds
7) Report condition of anchors, evidence of movement
8) Report condition of towers and saddles (verticality, lateral support)

8. Expansion Joint

a. Functioning (report crack in the existing gap and approximate temperature)
b. Report condition of sealing material (for neoprene sealing material for splitting, oxidation, creep, flattening, bulging and for bitumen filler, check for hardening, cracking, etc)
c. Report secureness of the joints
d. Top sliding plate (report corrosion, damage to welds, etc.)
e. Locking of joints (report locking of joints especially for finger type expansion joint)

f. Check for debris in open joints

g. Report rattling if any

9. Wearing Coat (concrete/bitumen)

a. Report surface condition (cracks, spalling, disintegration, pot holes, etc.)

b. Report evidence of wear (tell tale rings, check for thickness as against actual thickness, report date of last inspection)

10. Drainage Spouts

a. Check clogging, deterioration and damage, if any

b. Check the projection of the spout on the underside (see whether structural members are being affected)

c. Report adequacy thereof

d. For subway report about adequacy of pumping arrangement, etc.

11. Handrails

a. Report general condition, check expansion gaps, missing parts, if any, etc.

b. Report damage due to collision

c. Check alignment (report any abruptness in profile)

12. Footpaths

a. Report general condition (damage due to mounting of vehicles)

b. Report missing footpath slabs

13. Utilities

a. Report leakage of water and sewage pipes

b. Report any damage to telephone and electric cables

c. Report condition of lighting facilities

d. Report damages due to any other utilities

14. 14. Bridge Paint

a. Report condition of painting

15. 15. Aesthetics

Report any visual intrusion (bill boards, paints on structural members, etc.)

Annexure-T3

INFORMATION FOR FIXED TRAVERSE STATIONS

Name of Traverse Stations: _____

Northing: _____

Easting: _____

Elevation: _____

Affix Photograph of Traverse station

Sketch of the fixed traverse stations with reference to permanent features

Annexure-(1)

MINIMUM PERSONNEL PROPOSED BY THE CLIENT

S. No.	Position	Nos.	Months	Person-Months[1]
A. KEY PERSONNEL				
1.	Sr. Highway Engineer / Team Leader	01	2.50	2.50
2.	Pavement Specialist *	01	02	02
3.	Structure Engineer	01	02	02
4.	Geo Technical Engineer	01	02	02
5.	Traffic Engineer/ Economist	01	02	02
	Sub-Total (A):	***05***	-	***10.5***
B. NON KEY PERSONNEL				
6.	Quantity Surveyor	01	02	02
7.	Chief Surveyor	01	02	02
8.	Surveyors	04	02	08
9.	CAD Operator	02	2.50	05
	Sub-Total (B):	***08***	-	***17***
C. SUPPORT STAFF				
10.	Computer Operator	02	02	04
11.	Helper-I	04	02	08
12.	Helper-II	02	2.50	05
	Sub-Total (C):	***08***	-	***17***
	Total (A + B + C):	**21**	-	**44.5**

* The Pavement Specialist shall also carry out traffic studies and surveys.

National Highway Authority Govt. of Pakistan

[1] The proposed person-months are as per Client's assessment; if the consultant has reservation/opinion/suggestion regarding proposed person-months it may convey same in writing during Pre-Proposal Meeting or even after Pre-Proposal Meeting but before the last date for seeking clarification, for review and decision of NHA which will be communicated to all the prospective bidders.

CHAPTER NO.4

ENVIRONMENTAL IMPACT ASSESSMENT OF ROADS/ HIGHWAYS PROJECTS

1. Need for Environmental Impact Assessment (EIA)

Highway projects are generally undertaken to improve the economic and social welfare of the people. At the same time, they may also create an adverse impact on the surrounding environment. People and property in the direct path of the road works are affected. The environmental and social impact of highway projects include damage to sensitive eco-systems, soil erosion, changes to drainage pattern and thereby groundwater, interference with animal and plant life, loss of productive agricultural lands, resettlement of people, disruption of local economic activities, demographic changes, accelerated urbanization and increase in air pollution. Highway development and operation should, therefore, be planned with careful consideration of the environmental impact. To minimize these adverse effects that may be created by highway development projects, the techniques of EIA become necessary. Identification and assessment of potential environmental impact should be an integral part of the project cycle it should commence early in the planning process to enable a full consideration of alternatives and to avoid later delays and complications.

2. In view of the above, an EIA will be carried out for the Environmental aspects of all stages of the projects i.e. preconstruction, construction and post construction with the following objectives:

- Establishing the environmental baseline in the study area and identifying any significant environmental issue;
- Assessing these impacts and providing for the requisite avoidance, mitigation and compensation measures;
- Integrating the identified environmental issues in the project planning and design;
- Developing appropriate management plans for implementing, monitoring and reporting of the environmental mitigation and enhancement measures suggested;

The EIA studies and reporting requirements to be undertaken this TOR must conform to the guidelines and regulations issued by the Pakistan Environmental Protection Agency (Pak EPA), Ministry of Environment, Govt. of Pakistan (GOP) which comprise mainly of the Pakistan Environmental Protection Act 1997, its implementing regulations, the EIA Guidelines and Review of IEE and EIA Regulations, 2000. These guidelines include the amendments and subsequent rules for the IEE and EIA of projects.

i) **Regulations and Standards.** Describe the pertinent legislation, regulations and standards, and environmental policies that are relevant and applicable to the proposed project, and identify the appropriate authority jurisdictions that will specifically apply to the project.

ii) **Project Introduction.** The Consultants should categorize the project (category A or B and IEE or EIA) but may not be limited to the general information, rationale of the project, description of the project, and any revised alignment.

iii) **Project Description.** The Consultants should provide a brief history of the project, a detailed location and maps with scales (km) of the projects with any alignment (starting point to end point). In the project description the Consultants should also highlight but not limited to bridges information, project components, scope and schedule of operation and construction, construction camps, and construction materials.

iv) **Description of Environment.** Assemble, evaluate and present baseline data on the relevant environmental characteristics of the project area. In addition to general information, the Consultants should provide methodology for preparing the essential environmental data. The data should emphasize but may not be limited to the information about Physical Environment which could include, meteorology and climate, geology and soil, seismology, air and water quality, noise, topography and drainage patterns, hydrology and/or hydraulic regime, surface and ground water and land use. Ecological Resources should discuss about forests/flora/vegetation profile, crop and horticulture activities, and fauna/wild life and local livestock species (should specify mammals, birds, fish, reptiles and insects), protected and/or endangered wildlife species. Social and Cultural Resources may discuss about the methodology of surveys, settlement pattern, political and administrative setup, population and communities, socioeconomic conditions, protective and sensitive areas, archaeological and cultural sites, health and facilities, educational facilities, industrial/commercial activities, physical and cultural heritage, utilities, railway links or alignment, tourism facilities and potentials and others. Availability of Resources for Construction should also highlight about borrow soils, construction material, water and power availability and any other resources. Hazard vulnerability-identify vulnerability of area to flooding, hurricanes, storm surge, and earthquakes. Characterize the extent and quality of the available data, indicating significant information, deficiencies and any uncertainties associated with the prediction of impacts.

v) **Environmental Impacts and Mitigation Measures.** Identify any negative positive, direct, indirect, short term and long term impacts of the project, during pre-construction/design, construction and operation phases. Identify any information gaps and evaluate their importance for decision-making. The Consultants must recommend appropriate mitigation and rehabilitation measures for the environmental damage and other impacts identified for specific road corridors, and how they would be implemented with regards to: coordination between highway design and environmental issues, ambient air, water and noise quality, water resources, drainage, mineral resources, flora and fauna, social and cultural environment, historical sites. The Consultants should attempt to identify creative measures that

would also have positive social implications, such as participatory tree planting that would also serve as job creation for affected communities. Consultants should identify biological environment, and must discuss about national parks, game reserves and endangered species. Consultants should also identify the impacts and mitigation measures for topography, social / cultural issues, land acquisition and resettlement, community development, borrow open pits, waste disposal, geology and soil, surface and ground water, hydrologic regime, traffic flow, wastage of fertile humus layer, utilities issue and poverty alleviation etc.

However, report should not be limited to the above mentioned constituents of the environmental impacts and their mitigation measures. The Consultants should be more creative according to the specified project alignment. It should also include maps, figures and photographs when necessary.

In order to assess environmental impacts and recommend various mitigation measures to minimize the environmental impacts, identify and develop data.

vi) **Development of Environmental Data.** Identify EPA NEQS and guidelines and analyze following parameters to develop base line environmental data of the project:

- Ambient air quality.
- Noise levels.
- Water.
- Biological environment.
- Socio economic profiles.

i) AMBIENT AIR QUALITY:

Consultants should monitor the ambient air quality along the selected road site.

The parameters need to be monitored include Ozone (O_3) Carbon monoxide (CO) Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), and particulate matter (PM_{10}). Acceptable standard analysis methodology should be selected to measure the NEQS parameters.

Air quality data will be collected over a 24-hour period at all the sampling points *(a reasonable number of sampling and their analysis should depend upon the road length and other environmental factors which should provide a reasonable image of air quality).*

High pollutant concentrations spots should be selected for sampling to assess 'worst-case' scenarios, and measurements will be made in areas with extensive ribbon development and schools/hospitals where traffic will be expected to be a little heavier.

ii) NOISE LEVELS:

Roadside noise level measurements should be taken at a distance of ~ 6 m from the edge of the highway (corresponding roughly to 7.5 m from source vehicles). The noise parameter should be measured for 24 hours at various locations of the specified site. The permissible limit of noise is 85 dBA prescribed by the NEQS for motor vehicles. The NEQS do not prescribe a noise level limit for receptors. *(a reasonable number of sampling and their analysis should depend upon the road length and other environmental factors which should provide a reasonable image of noise pollution).*

iii) WATER QUALITY:

During field investigations, water samples from various sources in the vicinity of the proposed sections should be analyzed for important parameters with respect to human consumption. Although, NEQS include 32 water criteria pollutants for effluents and 16 NEQS for gaseous emissions, NHA prefer and recommend basic water quality analysis which may include but not limited to pH, turbidity, alkalinity, TDS, TSS, 5 day BOD at 20oC, COD, OD, total hardness, chloride, sodium nitrates, lead, mercury, arsenic, cadmium, total toxic metals, phenolic compounds as phenols, pesticides / herbicides / fungicides *(in farmland areas) and E-coli. (a reasonable number of sampling and their analysis should depend upon the road length, other environmental factors which should provide a reasonable representation of water quality).*

Consultants **must identify** standard and recognized laboratories. Consultants should also provide Analytical Laboratory Reports along with methodologies and analytical techniques used for each parameter. The analysis reports must include information, address and contact persons of analytical laboratories.

vii) **Analysis of Alternatives.** Describe the alternatives examined for the proposed project that would achieve the same objective including the "no change in alignment". Distinguish the most environmentally friendly alternatives. In case of minor impacts, which can be successfully mitigated within the ROW and without change in alignment, there will be no need for the analysis of alternative. In all other cases, and especially in the case of major or critical issues, a systematic comparison will be undertaken of the proposed design, site technology and operational alternatives in terms of:

Their potential environmental and social impacts;

Capital and recurrent costs;

Suitability under local conditions; and

Institutional, training and monitoring requirements.

For each alternative, the environmental cost and benefits should be quantified to the possible extent, and economic values should be attached where feasible. The basis for the selection of alternative proposal for the project design must be stated.

viii) (A) **Public Consultation, Involvement and Disclosure.** During the field surveys the Consultants will organize workshops and formal public consultation sessions at province level to identify main stakeholder, their categories, their views on the existing condition of the project, volume of traffic concern's stemming from the impact of improvement works, as well as safety related issues. If possible, Consultants will assist in inter-agency coordination, and public/NGO participation.

(B) Grievance Redress Mechanism

ix) **Environmental Management Plan (EMP).** Identify and prepare EMP including an implementation schedule and supervision program with associated costs and contracting procedures for the execution of environmental mitigation and social issues for pre-construction, design, construction and implementation phases. The Consultants should describe the objectives of EMP and key environmental and social components, role of functionaries, and road safety. The key components of EMP should emphasize but not limited to:

alignment and shoulder width options, road side safety, structural recommendations, topography, geology and soil, seismic activities, flood hazards, camp sites, borrow pits, archaeological sites, land acquisition and resettlement, local communities their social and cultural heritage, archaeological sites, waste disposal, air and water quality including ground and surface water, noise, flora including roadside vegetation cutting and plantation, fauna including wildlife, endangered species and their protection, traffic management, utilities, use of fertile humus soil recommendation of environmental protection sign boards, and health risk of workers. EMP should identify the training and workshops programs.

x) **Environmental Monitoring Plan.** Identify the critical issues requiring monitoring to ensure compliance to mitigation and environmental management plans and to measure and monitor the environmental impacts during construction and operation. The objectives of the plan are to monitor the actual impact of the works on the project corridor's physical, biological and socio-economic receptors within the corridor. This will indicate the adequacy of the EIA. The monitoring plan should recommend mitigation measures for any unexpected impact or where the impact level exceeds the limits. The plan should ensure compliance with legal and community obligations including safety on construction sites. Consultants should monitor the rehabilitation of borrow areas and the restoration construction campsites according to EMP report. The monitoring plan should ensure the safe disposal of excess construction materials. Consultants should also evaluate the effectiveness of the mitigation measures proposed in the EMP and recommend improvements if necessary. Apart from regular compliance checks the Consultants should generate a

tabular matrix for air, water and noise analysis, asphalt plant emissions, soil erosion and contamination, plantation, safety and traffic rules compliance for construction and operation phases.

Environmental Monitoring Plan will list the procedure through which mitigation measures proposed in EIA will be implemented. It will also include environmental parameter need monitoring, frequency and responsibilities of key players. In case of disagreement with local communities or stakeholders, grievances addressable mechanism shall be part of plan. The management plan will develop the institutional requirement and type of training to enhance the capabilities of staff. The total environmental mitigation, Monitoring, equipment and training cost shall also be included.

xi) **Economic Assessment.** This section should include the overall cost estimate in relation to the project benefits, environmental costs and total cost of the proposed project. The Consultants should address the cost analysis of training, monitoring activities, environmental analysis and activities, resettlement, land and property acquisition, and mitigation measures.

xii) **Role of Functionaries and Government Agencies Involvement.** This section should include role of all the functionaries and variable involvement of government agencies or authorities for the project accomplishment.

xiii) **Recommendation and Conclusions.** An adequate summary should emphasize on the project description and environment, environmental impacts and mitigation measures, alternatives, socio-cultural and socio economics, public consultation and the resulting issues and recommendations, environmental management and monitoring plans, economic assessment, recommendation and conclusions.

xiv) **Submission of Reports.** The report should be prepared and presented in strict conformity to IEE/EIA regulations, 2000 and Guidelines for preparation and submission of IEE/EIA 1997 issued under the Pakistan Environmental Protection Act, 1997.

The title page of the report should specify the report name, project name, highway length, scaled maps and / or colored photographs, date of the report, Consultants company name, address, phone numbers, e-mail and logos.

The reports should include acronyms list and a copy right certificate in the name of NHA. The reports should include all the key articles but not limited to the executive summary, introduction, description of the project, policy, all legal and administrative framework, description of the project environment, alternative analysis, environmental impacts and mitigation measures, public consultation and resettlement action plan, inter-agency and public/ NGO consultation process, environmental monitoring plans, economic assessment, conclusions and recommendations.

All figures, maps, appendices, tables, photographs, matrices and list of references should be chronologically organized and each page should be numbered.

(i) Initially Consultants should submit two draft copies of the report to NHA

(ii) After incorporating the comments from NHA, bureau of Environmental Protection/Provincial EPAs and donor agencies Consultants should finalize the report.

(iii) Consultants required submitting two hard copies and one soft copy of final EIA report to NHA.

(iv) Must fill and attach the application form for Environmental approval under Sec (12) of Pakistan Environmental Protection Agency (PEPA) Act 1997 (PEPA- Review of IEE and EIA-Schedule IV regulations, 2000). The form requires information of the description, Location, objective, alternative alignment, topography and land use of the project. In addition it also required information about the land acquisition in acres, environmental quality standard (NEQS) analyzed and measured, source of powers for the project construction and number of labour force (employees) required for the project construction and operation phases.

(v) The prepared Environmental Impact Assessment (EIA) report will be submitted to the concerned EPA for formal concurrence and will be disclosed to the public, stake holders etc.

*Ten hard copies and two electronic copies (format on CD) of the report are to be submitted should be labeled properly.

Public Hearing:

It will be the responsibility of the Consultants to obtain NOC from the respective EPA, and to prepare documents and presentations for EPA as and when required by EPA with due intimation to NHA.

Consultants' Fee for Services:

The payments to the Consultants for EIA shall be made in the following manner:

Sr. No.	Description	% of A'
(i)	Inception Report for services (within first 7 days of commencement).	10%
(ii)	Submission of draft EIA/IEE report.	30%
(iii)	Submission of final EIA/IEE report (ten hard and two soft copies) to concerned EPA.	20%
(iv)	Submission of final EIA/IEE report after attending all observation and comments of EPA.	20%

Sr. No.	Description	% of A'
(v)	Obtain NOC from concerned EPA including public hearing aspects.	20%
	Total:	**100%**

Where A' is the total payable amount in respect of EIA Study.

Consulting Service Period:

Consultants shall submit the final report within Two and half (2.50) months from the date of Date of Commencement of Services.