

NATIONAL HIGHWAY AUTHORITY

Procurement & Contract Administration Section

28 Mauve Area, G-9/I, Islamabad ☎ 051-9032727, 📠 051-9260419

No. 6(434)/GM (P&CA)/NHA/17/359

03 August, 2017

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 Preliminary
Design for Dualization of Kuchlac - Zhob Section of N-50 (305
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.

(HAFEEZ-UR-REHMAN)
Director-V (P&CA)

Encl: Evaluation Report along with Annex-I

Copy for kind information to:

- Member (Planning), NHA
- Member (Engineering-Coord), 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 Envelop Procedure
3.	Title of Procurement:	Consultancy Services for Feasibility Study and Preliminary Design for Dualization of Kuchlac - Zhob Section of N-50 (305 Km)
4.	Tender Inquiry No.:	6(434)
5.	PPRA Ref. No. (TSE)	TS307104E
6.	Date & Time of Bid Closing:	16 th March, 2017 at 1100 hours local time
7.	Date & Time of Bid Opening:	16 th March, 2017 at 1130 hours local time
8.	No of Bids Received:	Eight (8) 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 NESPAK (Pvt.) Ltd.	667	191	22,137,196	Top scoring firm in combined evaluation (PPRA Rule 36(b) (ix))
2) M/s Prime Engineering & Testing Consultants (Pvt) Ltd in Association with M/s Finite Engineering (Pvt) Ltd.	624	200	21,186,008	2 nd
3) M/s ABM Engineers – Karachi.	664	145	29,131,400	3 rd
4) M/s Republic Engineering Corporation (Pvt) Ltd in JV with M/s PEAS Consulting Pvt Ltd.	605	148	28,638,954	4 th
5) M/s Zeeruk International (Pvt.) Ltd in Association with M/s Kasib Associates & M/s Water wise.	609	126	33,731,405	5 th
6) M/s Asif Ali Associates (Pvt.) Ltd in JV M/s AA Associates.	606	101	42,040,037	6 th

2
1/2

7) M/s Associated Consultancy Centre (ACC) (Pvt) Ltd in Association with M/s Associated Consulting Engineers (ACE) (Pvt.) Ltd.	622	79	53,567,136	7 th
8) M/s SKAFS Consultants (Pvt) Ltd – INTECO s.r.l JV	-	-	-	PPRA Rule 36(b) (v) Non-Responsive in the light of Clause 3.1.4(a) Data sheet Clause 1.8(a) Checklist (S.No.5)

Top Ranked Bidder: M/s NESPAK (Pvt.) Ltd.

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:

General Manager (P&CA)

Official Stamp:

..... *National Highway Authority*
Islamabad

***Standard Bidding Documents (SBD).**

National Highway Authority



Annex-I

Criteria

FOR

Bid Evaluation

**Consultancy Services for Feasibility Study and
Preliminary Design for Dualization of Kuchlac
- Zhob Section of N-50 (305 Km)**

August, 2017



NATIONAL HIGHWAY AUTHORITY

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

Ref: 6 (434)/GM(P&CA)/NHA/2017/422


14/March-2017

All Prospective Consultants

Subject: **MINUTES OF PRE-PROPOSAL MEETING FOR:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
PRELIMINARY DESIGN FOR DUALIZATION OF KUCHLAC-ZOHB
SECTION OF N-50 (305 KM.).**

Reference: *Request for Proposal Notice for subject Services appeared in daily Newspapers on 24th February-2017*

The minutes of Pre-Proposal Meeting and Addendum No.1 for subject Services being integral part of the Request for Proposal (RFP), are enclosed herewith for necessary action, please.


(IMTIAZ AHMED KHOKHAR)
General Manager (P&CA)

Encl: Minutes of Pre-Proposal Meeting (05 Pages).
Addendum No.1 (02 Pages)

Copy for information:

- Member (Engg.-Coord) NHA, Islamabad.
- Director (P&CA)-I, NHA, Islamabad.
- Office Copy

**MINUTES OF PRE-PROPOSAL
MEETING HELD ON 2nd March 2017**

**Consultancy Services for Feasibility Study and Preliminary Design for
Dualization of Kuchlac – Zhob Section of N-50 (305 KM)**

A Pre-Proposal Meeting was held in NHA Auditorium at 1100 hours on 2nd March, 2017 to discuss the Request for Proposal (RFP) for subject Services. Following NHA officers and representatives of prospective consultants attended the meeting:

▪ **National Highway Authority**

- Mr. Parkash ... Director (Planning)
- Mr. Asim Amin ... General Manager (Design)
- Mr. Imtiaz Ahmed Khokhar ... General Manager/Director (P&CA) - I
- Mr. Tariq Riaz ... Deputy Director (P&CA) - V

▪ **Consultants**

- Mr. Niaz Ahmed ... M/s ABM Engineering Karachi
- Mr. Azizullah Khan ... M/s Osmani & Co. (Pvt.) Ltd.
- Mr. Ahmed Luqman ... M/s ACC
- Mr. Tanveer Ahmed ... M/s MM Pakistan
- Mr. Naeem Mahmood Khan ... M/s EGC (Pvt.) Ltd.

2. The queries submitted during the above mentioned pre-proposal meeting and thereafter through E-mail/letter and their clarifications/ replies are summarized below for information of all prospective bidders:

Sr. No	Questions / Queries	Replies of Queries
1	Referring clause 3.1.4(d) of Data Sheet on page-12 of RFP, the condition for "proposed Key Staff shall be permanent employees who are employed with the Consultants at least six months prior to submission of proposal" may please be exempted or relaxed as it is cumbersome to retain the design team/personnel all time in the absence of any significant project.	Not acceded to, please proceed as per RFP.
2	Please refer to Clause No. 4.4 of the Data Sheet on page 16. It is requested that the date of submission may kindly be extended for another two weeks for preparation of sound and be-fitted proposal.	Not acceded to, please proceed as per RFP.
3	It is our understanding that all primary / secondary data would be delivered to the successful Consultant prior to commencement of the assignment in case of award and access to the site shall be ensured without any halt.	Input of client is limited as mentioned in the TOR. However, NHA may share old project record.(if available)

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4	Please refer page 3 of TOR of the RFP regarding 4-months' timeperiod for completion of the project which is a tight schedule in accomplishing the assignment under given scope of work and deliverables. It is requested to review the same and may please be enhanced to minimum 6 months for completion of the consultancy services..	Not acceded to, please proceed as per RFP.
5	The Key-staff viz; Hydrologist / Drainage Engineer, Hydraulics Specialist for Hydrology and Hydraulic Study, Environment Expert, Sociologist for resolution of re-settlement issues and stake-holders consultation, and Contract Specialist are missing from the given List on page Nos.12 to 14 respectively indicated in Data Sheet of RFP. Please clarify.	Refer form A-16(Direct Cost), Provisional sum of Rupees One (01) Million is already reflected under the head of Envioremental Impact Assessment and Provisional sum of Rupees Five (05) Million is reflected under the head of Hydrology & Hydraulic Study. Team Leader should manage the task of Contract Specialist with the help of experts available in the TOR.
6	What is the estimated budget of this project? Further, Location Map shown on page-4 of TOR is not clear which may please be provided transparent.	A fresh Location Map is attached with these minutes of meeting. (Annex-I)
7	Please refer Form A-16 of the RFP on page 42, there is no allocation of Provisional Sum(P.S) amount reserved for geo-technical studies of bridges/interchanges or fly-overs in addition to hydraulic/drainage structures.	Geotechnical investigation is not required and therefore not reflected any where in the TOR. Item at Serial No. 09 of Direct (Non Salary) Costs at Form A-16 is also stands deleted accordingly. (Refer Addendum # 1)
8	The criteria for academic qualification and their professional experience of consultant's staff as mentioned in the RFP / TOR is strict to meet the requisite requirements which may kindly be relaxed.	Not acceded to, please proceed as per RFP.
9	Refer page-1 of Chapter No,3&4 of the RFP, the time scale for the approval of Stage-1/Feasibility is not defined before taking up Stage-II and Stage-III under given Scope of Work & Deliverables. Please indicate this duration.	Consultants are advised to get approval from the Employer for the commencement of stage II/III after completing assignment under stage I.
10	Refer Note-3 on page-43 of RFP, the taxes requirement to be built-in the quoted rates as taxes are personal liabilities and not the cost of services. Therefore the taxes should be "non-competitive cost" and should not be weighed in bid evaluation. Therefore the taxes may be asked to be shown separately. GST is another kind of tax which is a reimbursable tax for the Consultants and should also be "non-competitive" component of the bid. Kindly clarify.	All the taxes except General Sales Tax should be built in the rates and not expressed seperately.

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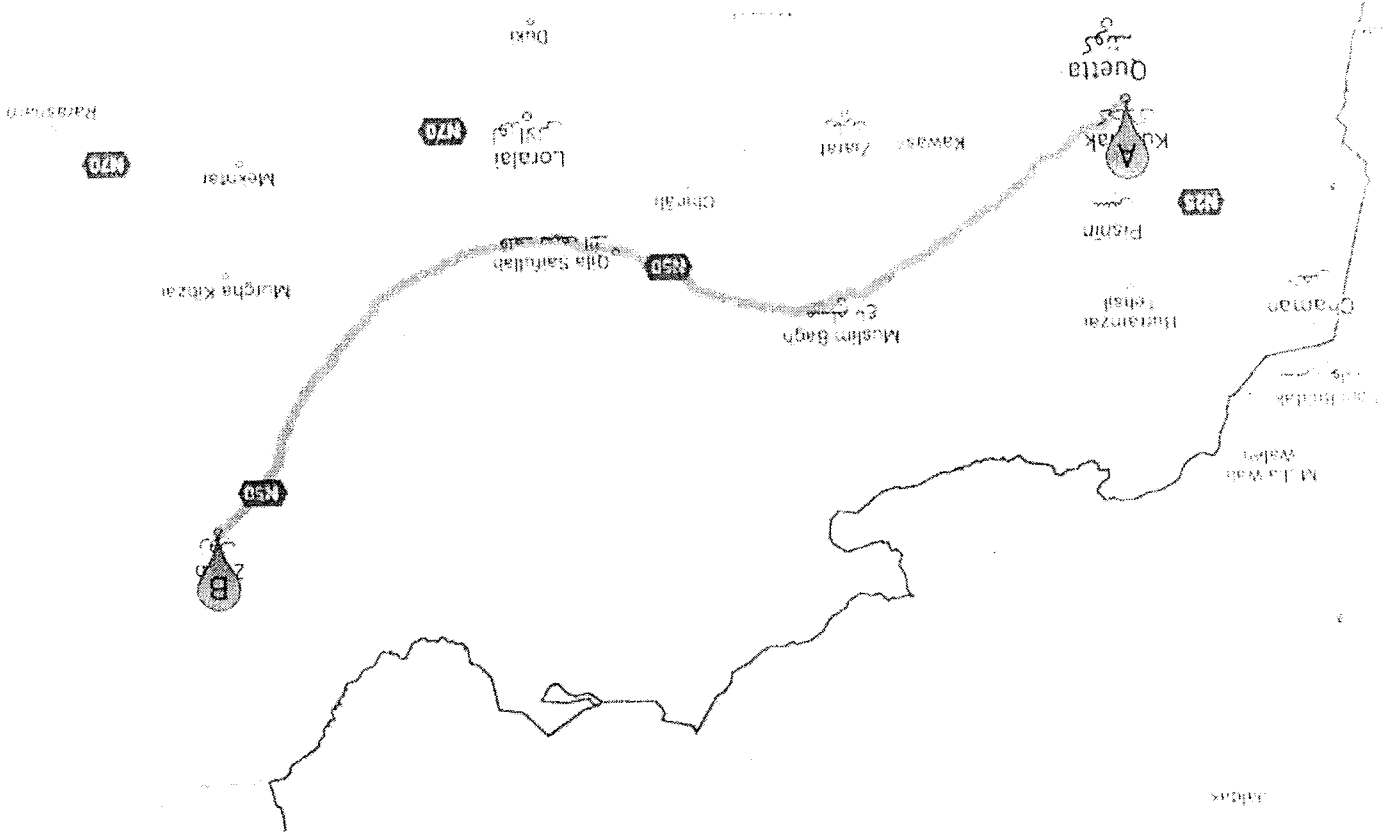
11	Reference Task 6, EIA Report & NOC of TOR: It is mentioned that Consultants shall carry out EIA study for the subject project but input of Environmental Expert is not provided in the RFP.	Refer form A-16(Direct Cost), Provisional sum of Rupees One (01) Million is already reflected under the head of Envioremental Impact Assessment.																		
12	Reference Task 8, Hydrology & Hydraulic Study of TOR: It is mentioned that Consultant shall carry out Hydrological & Hydraulic Study for the project but input of Hydrology & Hydraulic Expert is not provided in the RFP.	Refer form A-16(Direct Cost), Provisional sum of Rupees Five (05) Million is already reflected under the head of Hydrology & Hydraulic Study.																		
13	Reference Task 14, Tender Documents of TOR: It is mentioned that Consultant shall prepare Tender Documents but the input of Contract Specialist is not provided in the TOR.	Team Leader should manage this task with the help of experts available in the TOR.																		
14	Security of Staff: There are security issues for site design staff on the project area and to eliminate these security threats, the consultant will have to assume some cost for the security. The cost to be incurred on security may vary from consultant to consultant, therefore EGC suggests NHA either to include provisional sum (PS) for security or NHA to provide security for site staff for the competitive bid.	Consultants are responsible for security and are advised to built security expenditure in the charge rate of their experts and staff accordingly.																		
15	Geotechnical Investigation: The Geotechnical Investigation scope for Kuchlac Zobe road is included in the TOR whereas the geotechnical investigation scope for bridges is not indicated anywhere in the TOR. It is suggested that the cost for geotechnical investigation for bridges should be included either as PS or number of total boreholes with depth should be included in TOR.	Geotechnical investigation is not required and therefore not reflected any where in the TOR. (Refer Addendum # 01)																		
16	The man-months for the Pavement/Traffic Engineer may be increased to 4 months, since the Project requires preparation of PC-1 etc. or otherwise include the Pavement Engineer and Traffic Engineer as two separate Key Professionals with 2 man-months each.	Not acceded to, please proceed as per RFP.																		
17	Surveyor is included as Key Professional Staff on pages 14, 19 & 20 which may needs to be reviewed and replaced as suggested in item 1.	Not acceded to, please proceed as per RFP.																		
18	Since the project requires the preparation of "Land Acquisition Folders", "Alignment stake-out", "Construction Machinery Report", Design Reports includes condition survey of existing structures", Tender Documents" etc. The support staff with associated Man-Month provided in the RFP/TOR may not be enough to complete the task as per the required quality. Following support staff is suggested.	Not acceded to.																		
<table border="1"> <thead> <tr> <th>Support Staff</th> <th>Numbers</th> <th>Man-Months</th> </tr> </thead> <tbody> <tr> <td>Junior Engineers</td> <td>4</td> <td>4</td> </tr> <tr> <td>Surveyors</td> <td>2</td> <td>4</td> </tr> <tr> <td>Survey Helpers</td> <td>4</td> <td>4</td> </tr> <tr> <td>CAD Operator</td> <td>4</td> <td>4</td> </tr> <tr> <td>Computer Operator</td> <td>4</td> <td>4</td> </tr> </tbody> </table>			Support Staff	Numbers	Man-Months	Junior Engineers	4	4	Surveyors	2	4	Survey Helpers	4	4	CAD Operator	4	4	Computer Operator	4	4
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Junior Engineers	4	4																		
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CAD Operator	4	4																		
Computer Operator	4	4																		

19	It is suggested to include a L.S item for undertaking the Traffic Counts, O&D and Axle Load survey etc. in "FORM A-16" on page 42 to cover the cost for this task.	Not acceded. A position of Traffic / Pavement Engineer is already provided in the key staff for undertaking said services.
20	Please clarify whether the pavement condition survey as well as the existing structure survey is required or not, if yes then a L.S item may needs to be included in "FORM A-16" on page 42.	Condition survey of existing structures is required as per section 3.3.32 of TOR for which Senior Structural Engineer is mentioned in the Key Staff.
21	Since the exact scope and extent of Investigation and Testing cannot be ascertained at this stage. It is suggested that in lieu of L.S items, P.S item for soil investigation in the amount of 2,000,000 and a P.S item for Geotechnical Investigation of 2,000,000 shall be included. This should also be included/replaced in the Mode of Payments on Page 35 of the TOR.	Geotechnical investigation is not required and therefore not reflected any where in the TOR. The scope of soil investigation is duly given under task-5 in the TOR and a position of Material Engineer is also provided in the key staff.
22	Since the Project is for Preliminary Drawings and not for the Detailed Drawings, therefore item h "Construction Drawings" on page 31 may be deleted	Consultant is required to provide Tender Drawing in accordance with para 3.14 (d) of TOR meeting the detailed requirement as mentioned under para 3.14 (h).
23	In our opinion, interchanges are not required for this facility having classification as Dual carriageway/Highway, therefore any references to the interchanges may needs to be deleted please	Interchanges are only referred under para 3.15 (2) of TOR which may be consider as deleted.
24	The time period for the completion of the Project is unrealistic, highly optimistic and should be extended to 7 months minimum. This is reflected in the <i>Attached Work Program</i> for the activities on the critical path.	Not acceded to, please proceed as per RFP.
25	In our opinion the Cattle Creep Survey is not related to Task 4 "Traffic & Axle Load Survey". It is suggested that it should be removed from this head and should be moved under Reconnaissance survey under Task 2.	Comment is agreed but it has no direct impact on Scope or Cost.
26	It is mentioned on page 1 of the TOR under stage-I that Feasibility with approximate cost estimate on best effort basis shall be required. But this is neither mentioned anywhere under description of Tasks (item 3.1) nor it is listed under deliverables. If required then a separate L.S item shall be introduced in "FORM A-16" on page 42 to quote its cost in the Financial Proposal.	Refer to serial No. 1 "Mode of Payment" for the task (2), it may be retitled as "Alignment/Feasibility Study Report." Furthermore, outcome of task (2), Page No. 3 of TOR may also be retitled as described above. (Refer Addendum # 01)
27	In our opinion Traffic Diversion plans is not related to Task 4 "Traffic & Axle Load Survey". It is suggested that it should be removed from this head and should be treated as separate Task. The timing and sequence shall be just before the Tender Documents as the diversion plans shall only be finalized once all the designs are done. The corresponding items should be introduced into the Mode of payment and also in "FORM A-16" on page 42 to quote its cost in the Financial Proposal.	Not acceded to.

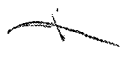
<p>28</p>	<p>It is mentioned under the Task 14 "Tender Documents", following drawings are required to be prepared and submitted</p> <ul style="list-style-type: none"> a) Drainage Plans for surface runoff and urban areas b) Mass Haul Diagram (including the disposal of unsuitable material and location of sites for borrow material) c) Landscaping details / plans <p>It is suggested that the separate Tasks for each of the items a, b and c shall be inserted along with the addition of the corresponding items into the Mode of payment and also in "FORM A-16" on page 42 to quote its cost in the Financial Proposal as L.S items otherwise it is not attended in almost all of the Contracts and neglected by all the Consultants and may be a source of generation of Audit Paras.</p>	<p>The mentioned drawings shall be prepared by the consultant as a part of tender drawing i.e Volume-IV of Tender Documents of TOR. Submission of tender documents is already reflected in the mode of payment.</p>
<p>29</p>	<p>In our opinion, service areas are not required for this facility having classification as Dual carriageway/Highway, therefore any references to the service areas may needs to be deleted please</p>	<p>Service areas are only referred under 3.15 (2) of TOR which may be consider as deleted.</p>

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ADDENDUM No.1

Consultancy Services for Feasibility Study and Preliminary Design for Dualization of Kuchlac – Zhob Section of N-50 (305 KM)

Following amendments have been made in the Request for Proposal (RFP) for subject Services under this Addendum No.1, which shall be read and construed as an integral part of RFP and shall take precedence in case of any conflict(s)/ambiguity(s) amongst this Addendum No.1 and other provisions of the RFP.

1. FINANCIAL PROPOSAL FORMS (Form A-16)

1.1. Direct (Non-Salary) Costs

Refer Form A-16 of Financial Proposal Form, item at Serial No. 09, Page 42 of RFP; "Geotechnical Investigation for Structures" is deleted in its entirety. (Revised Form A-16 is attached)

2. TERMS OF REFERENCE (TOR)

- 2.1. Refer to Mode of Payment Serial No. 1, for the Task 2: Alignment Study Report, Chapter 3&4, page 35 of TOR; it is re-titled as "Alignment/Feasibility Study Report".
 - 2.2. Refer to Title of outcome of Task 2: Alignment Study Report, Chapter 3&4, page 3 of TOR; it is re-titled as "Alignment/Feasibility Study Report".
3. All other terms and conditions shall remain same.

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(REVISED)

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	L.S			
5.	Communication expenses	P.Month			
6.	Drafting/ Reproduction of Reports	L.S			
7.	Office/ Drafting Supplies	L.S			
8.	Soil investigation along the alignment	L.S			
9.	Provisional Sum Items				
a.	Environmental Impact Assessment	P.S	-	-	1,000,000
b.	Hydrology and Hydraulic Study	P.S	-	-	5,000,000
10.	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 the Client **shall not** include this cost in the total cost offered by the Consultant for this assignment.



6(434)
National Highway Authority



REQUEST FOR PROPOSAL

for

**Consultancy Services
for**

**Feasibility Study and Preliminary Design for Dualization
of Kuchlac – Zhob Section of N-50 (305 KM)**

Pages (1 to 133)

February, 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)

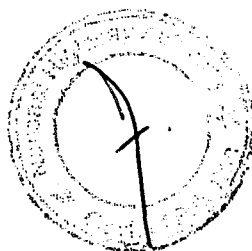
To,

All prospective consultants

Gentlemen!

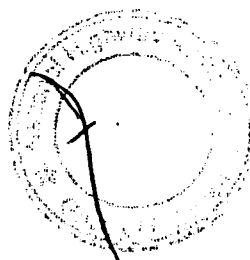
We extend warm welcome to you and invite you for participating in this project. We hope that you will live up to your reputation and provide us accurate information so that the evaluation is carried out "just and transparent". Please understand that the contents of this RFP, where applicable, shall be 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
5. Personnel Evaluation Sheet
6. Technical Proposal Forms
7. Financial Proposal Forms
8. Appendix A (Terms of Reference)
9. Appendix B (Man-Months and Activity Schedule)
10. Appendix C (Client's Requirements from the Consultants)
11. Appendix D (Personnel, Equipment, Facilities and other services to be provided by the Client).
12. Appendix E (Copy of Model Agreement)



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:
- 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.
- 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 envelopes, 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:

$$S_f = (1000 \times F_m) / F$$

(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 (Sf) 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:

$$S = S_t \times T \% + S_f \times P \%$$

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.

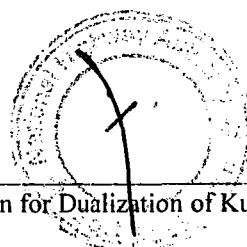
- 6.2 Negotiations normally take from two to five days. The aim is to reach agreement on all points and initial a draft contract by the conclusion of negotiations.
- 6.3 Negotiations shall commence with a discussion of your technical proposal. The proposed methodology, work plan, staffing and any suggestions 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.



DATA SHEET

LOI Clause No.	DESCRIPTION OF CLAUSE
1.1	<p>The name of Assignment is:- Consultancy Services for “Feasibility Study and Preliminary Design for Dualization of Kuchlac - Zhob Section of N-50 (305 KM)”.</p> <p>The Client’s Name is:- National Highway Authority</p>
1.2	<p>The description and the objectives of the assignment are: As per TOR</p>
1.3	<p>Phasing of the Assignment (if any): Nil</p> <p>The Consultant shall commence the assignment upon signing of Contract Agreement between NHA and the successful Consultant.</p>
1.5	<p>Pre-Proposal Conference: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>The name and address of the Official is:</p> <p>General Manager (P&CA) National Highway Authority 28, Mauve Area, G-9/1 Islamabad</p> <p>Date, Time and Venue for Pre-proposal Conference:</p> <p>Date: 2nd March, 2017 Time: 1100 hours Venue: NHA Auditorium (HQ) National Highway Authority 28, Mauve Area, G-9/1 Islamabad.</p>
1.6	<p>The Client shall provide the following inputs:</p> <p>As per TOR and Appendix D.</p>
1.7	<p>Following sub-clauses are added:</p> <p>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.</p>

	<p>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.</p>
1.8	<p>The Invited Consultants / Eligible Consultants are:</p> <p>Any firm meeting the following requirements:</p> <p>(a) Valid Registration Certificate of Pakistan Engineering Council.</p> <p>(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).</p> <p>(c) Facilities available with the Consultant to perform their functions effectively (proper office premises, software, hardware, record keeping etc.)</p> <p>(d) ✓ Client's satisfaction certificates (Performance Reports) for the <u>last three</u> 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.</p> <p>(e) Signing and certification of the Checklist for Completeness of the Proposal as per attachment at the end of Data Sheet.</p> <p>(f) Man-months of staff and Project Duration as per TOR.</p>
2.1	<p>The Documents are:</p> <p>(a) Letter of Invitation (LOI).</p> <p>(b) Instructions to Consultants (ITC).</p> <p>(c) Data Sheet.</p> <p>(d) Technical Proposal Forms.</p> <p>(e) Financial Proposal Forms.</p> <p>(f) Appendix – A: TOR and Background Information.</p> <p>(g) Appendix – B: Man-Months and Activity Schedule</p> <p>(h) Appendix – C: Client's Requirements from the Consultant.</p> <p>(i) Appendix – D: Personnel Equipment, Facilities and Other Services to be Provided by the Client.</p> <p>(j) Appendix – E: Copy of Model Agreement/ Draft Form of Contract & Appendices etc.</p> <p>(k) Form of Contract (<i>For Consultants to perform services as a Joint Venture</i>)</p>

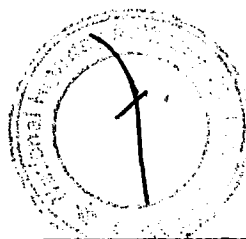
2.2	<p>The words "Twenty one (21)" is deleted in its entirety and replaced with "Five (05)"</p> <p>The address for seeking clarification is:</p> <p>General Manager (P&CA) National Highway Authority 28, Mauve Area, G-9/1, Islamabad E-mail: gmpca.nha@gmail.com</p>
3.1.1	<p>Add following:</p> <p>The proposals 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 of opening.</p>
3.1.4	<p>Add following:</p> <p>d. Proposed key staff shall preferably be permanent employees who are employed with the consultants at least six months prior to submission of Proposal.</p> <p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>The minimum required experience of proposed Key staff is given below:</p>
FOR KEY STAFF	
Team Leader/ Sr. Highway Engineer	<p>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);</p> <p>-OR-</p> <p>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)</p> <p>He/she must also have performed as Team Leader for at least three (03) major Highway Design Projects</p>
Senior Structure Engineer	<p>Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience (proven fifteen (15) years' design experience as <u>Structure Design Engineer</u> on National Highways Projects);</p> <p>-OR-</p> <p>M.Sc. (Structure Engineering) with minimum eighteen</p>

	(18) years relevant experience (proven thirteen (13) years' design experience as Structure Design Engineer on National Highways Projects)
Material Engineer	<p>Minimum B.Sc. (Civil Engg./Geo-Tech Engg.) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Material/ Geo Technical Engineer on major Highways and Bridges Projects];</p> <p>-OR-</p> <p>M.Sc. (Geo-Tech Engg.) with minimum eighteen (18) years' relevant experience [proven thirteen (13) years' design experience as Material/ Geo Technical Engineer on major Highways and Bridges Projects]</p>
Pavement / Traffic Engineer	<p>Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience [proven fifteen (15) years' design experience as Pavement /Traffic Engineer on major Highways Projects];</p> <p>-OR-</p> <p>M.Sc. (Highway Engg./ Transportation Engg.) with minimum eighteen (18) years' relevant experience [proven thirteen (13) years' design experience as Pavement/Traffic Engineer on major Highways Projects]</p>
Quantity Surveyor	<p>DAE (Civil); preferably having Bachelor's in Civil Engineering.</p> <p>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.</p> <p>-OR-</p> <p>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.</p>
Chief Surveyor	<p>DAE (Civil); preferably having Bachelor's in Civil Engineering.</p> <p>In case of DAE having minimum twenty (20) years post-qualification experience in Highway Sector which includes proven ten (10) years' experience as Chief Surveyor on Highway Projects.</p> <p>-OR-</p> <p>In case of Bachelor's Degree having minimum fifteen (15) years post-qualification experience in Highway Sector including seven (7) years' experience as Chief</p>

		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.
	<u>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.</u>	
	e. Training is an important feature of this Assignment: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If Yes, details of training are given in TOR	
3.2.1	The last line of this Para is deleted in its entirety and replaced with following: The total cost is to be specified in the Form A-17 and accordingly also in Form A-11	
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.	

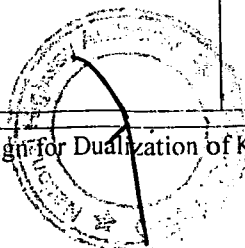
	<p>The address for writing on the proposal is:</p> <p>General Manager (P&CA) National Highway Authority 28, Mauve Area G-9/1 Islamabad Telephone: +92-51-9032727 Facsimile: +92-51-9260419</p>																																
4.4	<p>The date and time of proposal submission is:</p> <p>Date: 16th March, 2017 Time: 1100 hours Location of Submission : NHA Main Auditorium National Highway Authority 27, Mauve Area G-9/1 Islamabad.</p>																																
4.5	<p>Validity period of the proposal is: 180 days The bid shall remain valid upto : 12th September, 2017</p> <p>The location for negotiation of proposal is: Office of General Manager (P&CA) National Highway Authority 28, Mauve Area G-9/1 Islamabad Telephone: +92-51-9032727 Facsimile: +92-51-9260419</p>																																
5.2	<p>The evaluation of technical proposal shall be based on following criteria:</p> <table border="1"> <thead> <tr> <th>Description / Items</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td>i. Qualification of the Firm</td> <td>125</td> </tr> <tr> <td> a) General Experience (25)</td> <td></td> </tr> <tr> <td> b) Specific Experience of the Firm (100)</td> <td></td> </tr> <tr> <td>ii. Approach & Methodology</td> <td>180</td> </tr> <tr> <td> Understanding of Objectives (20)</td> <td></td> </tr> <tr> <td> Quality of Methodology (50)</td> <td></td> </tr> <tr> <td> Innovativeness/Comments on TOR (20)</td> <td></td> </tr> <tr> <td> Work Program (40)</td> <td></td> </tr> <tr> <td> Staffing Schedule (40)</td> <td></td> </tr> <tr> <td> Conciseness, clarity and completeness in proposal presentation (10)</td> <td></td> </tr> <tr> <td>iii. Qualification and Experience of the Key Staff</td> <td>550</td> </tr> <tr> <td>iv. Present commitment of the Firm</td> <td>025</td> </tr> <tr> <td>v. Past performance of the firm</td> <td>120</td> </tr> <tr> <td>Total Points:</td> <td>1000</td> </tr> <tr> <td>Minimum qualifying technical score:</td> <td>700</td> </tr> </tbody> </table>	Description / Items	Points	i. Qualification of the Firm	125	a) General Experience (25)		b) Specific Experience of the Firm (100)		ii. Approach & Methodology	180	Understanding of Objectives (20)		Quality of Methodology (50)		Innovativeness/Comments on TOR (20)		Work Program (40)		Staffing Schedule (40)		Conciseness, clarity and completeness in proposal presentation (10)		iii. Qualification and Experience of the Key Staff	550	iv. Present commitment of the Firm	025	v. Past performance of the firm	120	Total Points:	1000	Minimum qualifying technical score:	700
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	<p>The points earmarked for evaluation sub-criteria (iii) for suitability of Key Staff are:-</p> <table border="1"> <thead> <tr> <th>Description / Items</th> <th>Points (%)</th> </tr> </thead> <tbody> <tr> <td>i. Academic and General Qualifications</td> <td>30</td> </tr> <tr> <td>ii. Professional experience related to the Project</td> <td>60</td> </tr> <tr> <td>iii. Status with the firm (Permanent & duration with Firm as per LOI Clause 3.1.4 (d))</td> <td>10</td> </tr> <tr> <td>Total Points:</td> <td>100</td> </tr> </tbody> </table>	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
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5.3.1	<p>Following is added:</p> <p>The words “three top-ranking qualifying consulting firms” is deleted in its entirety and replaced with the words “qualifying consultants”</p> <p>The date, time, and address of the financial proposal opening are:</p> <p>After evaluation and approval of technical proposals (TO BE INFORMED LATER).</p>										
5.3.3	<p>The weights given to the Technical and Financial Proposals are:</p> <p>Technical: 80% ✓</p> <p>Financial: 20% ✓</p>										
6.3	<p>Add following at the end of this Para:</p> <p>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 bases.</p>										
7.2	<p>The assignment is expected to commence in: May, 2017</p>										
8	<p>The Clause is deleted in its entirety.</p>										



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 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
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 (alongwith authorization)
4.	TECHNICAL PROPOSAL FORMS A-1 to A-10 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.	Performance Certificate/ Assignment Completion Certificate (All completed projects mentioned under TECHNICAL PROPOSAL FORM A-2 CLIENT'S REFERENCE Note: Any project mentioned completed under Form A-2 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	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
	NHA reserves the right to verify the Performance/Assignment Completion Certificates.		
10.	FINANCIAL PROPOSAL FORMS A-11 to A-17 duly completed as per Instructions to Consultants/ Data Sheet and requirements of TOR (To be attached with Financial Proposal)	Must provide	Must provide
11.	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
12.	Signing and stamping of proposal (Technical and Financial) wherever indicated as well as initial/ signature and seal on all other pages of proposals	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.

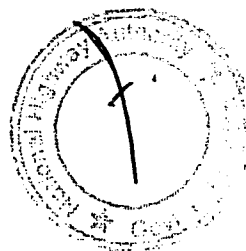
Signature of authorized representative of the firm(s) Date: _____
Day/Month/Year

Full name of authorized representative: _____

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

(Seal)

Note: Copy or scanned signatures are not allowed



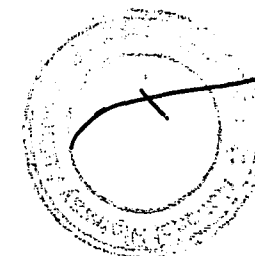
SUMMARY EVALUATION SHEET FOR FULL TECHNICAL PROPOSALS (QCBS)

EVALUATION CRITERIA		Max. Weight	Firm 1		Firm 2	
			Rating	Score	Rating	Score
I. Firms Experience		125				
	a) General Experience of the firm	25				
	b) Specific Experience of the firm	100				
II. Approach and Methodology		180				
	a) Understanding of Objectives	20				
	b) Quality of Methodology	50				
	c) Innovativeness / Comments on TOR	20				
	d) Work Program	40				
	e) Staffing Schedule	40				
	f) Conciseness, clarity and completeness in proposal presentation	10				
III. Personnel (Areas of Expertise - Qualification and Competence of Key Staff)		550				
	a) Team Leader/ Sr. Highway Engineer	130				
	b) Senior Structure Engineer	90				
	c) Pavement/Traffic Engineer	90				
	d) Material Engineer	90				
	e) Quantity Surveyor	60				
	f) Chief Surveyor	60				
	g) Surveyor	30				
IV. Present commitment of the firm		25				
V. Past performance of the consultant in last three assignments		120				
The basis for Past Performance of the consultant is the report from various quarters in NHA particularly Design Section. The Client's satisfaction certificates are also required to be attached for last three completed projects of comparable magnitude.						
The current commitments are to be assessed as per works in hand by the consultant.						
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.



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)
		Percentage Rating	Weighted Rating (A)	Percentage Rating	Weighted Rating (B)	Percentage Rating	Weighted Rating (C)	(A+B+C)
(Show all experts to be evaluated)								
i. Team Leader/ Sr. Highway Engineer								
ii. Senior Structure Engineer								
iii. Pavement/Traffic Engineer								
iv. Material Engineer								
v. Quantity Surveyor								
vi. Chief Surveyor								
vii. Surveyor								

Rating: - Excellent - 100%

Very good - 90-99%

Above Average - 80-89%

Average - 70-79%

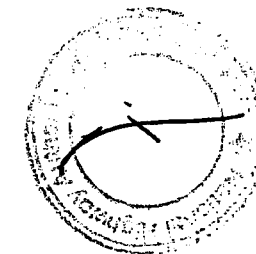
Below Average - 1-69%

Non-complying - 0%

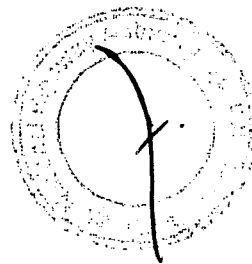
Score: Maximum Weight X rating / 100.

* For Team Leader/ Highway Engineer, Senior Structure Engineer, Material Engineer, Pavement/Traffic Engineer, 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%.
For Quantity Surveyor B.Sc with additional Trainings/courses relevant to assignment -100%, B.Sc-80%, DAE-70%

** Full time - 100%; Part time with previous association - 50%; Part time only for this assignment - 0%



TECHNICAL PROPOSAL FORMS



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: _____

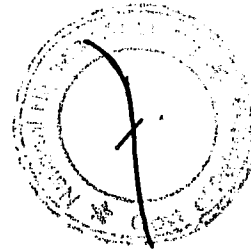
Name of Consultant (company's name or JV's name): _____

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}



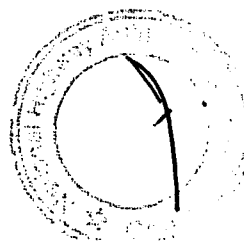
CLIENT'S REFERENCE

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

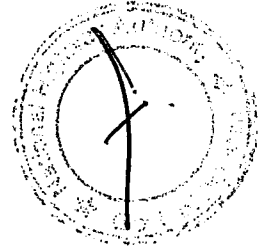
Using in the format below, provide information on each reference assignment for which your firm, either individually as a corporate entity or as one of the major companies within a consortium, was largely contracted.

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: _____



**APPROACH PAPER ON METHODOLOGY PROPOSED FOR PERFORMING THE
ASSIGNMENT**



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.

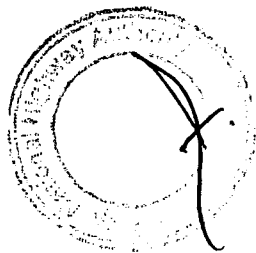
2.

3.

4.

5.

Etc.



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)
10. Detailed Tasks Assigned on the Project: _____

11. 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].

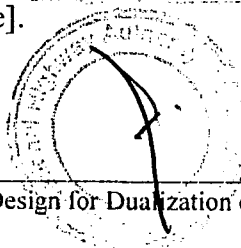
12. Education

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

13. 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].

14. Languages



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

15. 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.

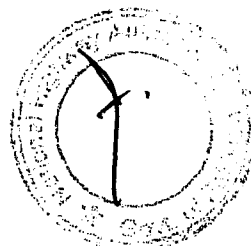
I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Signature of expert or authorized
representative of the firm

Date: _____
Day/Month/Year

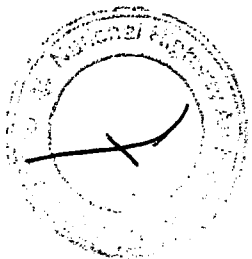
Full name of authorized representative: _____

Note: Copy or scanned signatures are not allowed



COMPLETION AND SUBMISSION OF REPORTS AS PER TOR

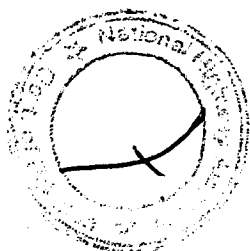
Reports	Date
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	



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



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



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,



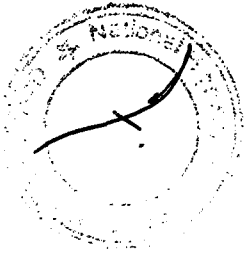
Signature _____
 (Authorized Representative)

Full Name _____
 Designation _____
 Address _____

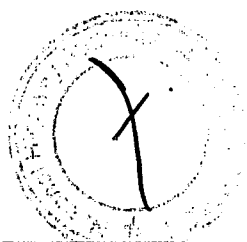
CURRENT COMMITMENTS OF THE FIRM

(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



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}: _____

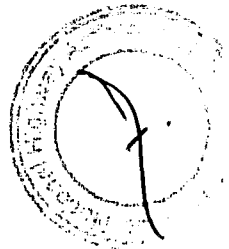
Name and Title of Signatory: _____

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:

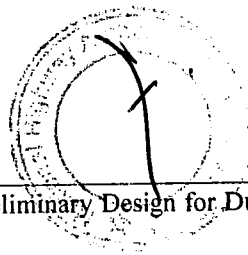
40% of

- 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.

Full Name: _____

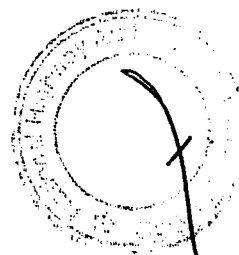
Signature: _____

Title: _____



ESTIMATED LOCAL CURRENCY SALARY COSTS/REMUNERATION

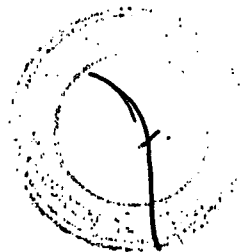
Sr. No.	Position	Name	Staff-Months	Monthly Billing Rate	Total Estimated Amount (Rs.)
I. Professional / Key Staff					
Sub-Total:					



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.



(REVISED)

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	L.S			
5.	Communication expenses	P.Month			
6.	Drafting/ Reproduction of Reports	L.S			
7.	Office/ Drafting Supplies	L.S			
8.	Soil investigation along the alignment	L.S			
9.	Provisional Sum Items				
a.	Environmental Impact Assessment	P.S	-	-	1,000,000
b.	Hydrology and Hydraulic Study	P.S	-	-	5,000,000
10.	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 the Client **shall not** include this cost in the total cost offered by the Consultant for this assignment.

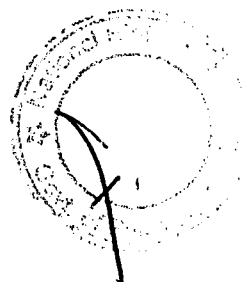


SUMMARY OF COST

Sr. No.	Description	Amount (Rs.)
1.	Salary Cost / Remuneration	
1(a).	Sales Tax @ 16% on item 1 above which shall be kept as Provisional Sum in the Contract Agreement	
2.	Direct (Non-Salary) Cost	
3.	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 Consultant 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 1(a) shall also be rectified during evaluation of the Financial Proposal.



APPENDIX-A

TERMS OF REFERENCE

(TOR)

Chapter No. 1 & 2	Pages (1to 4)
Chapter No. 3 & 4	Pages (1to 37)



CHAPTER NO. 1 INTRODUCTION

1.1 BACKGROUND:

China-Pakistan Economic Corridor (CPEC) is essentially a Development Corridor comprising of multiple components viz: Energy, Transport & Infrastructure, Gwadar Port and Industrial cooperation involving gigantic foreign investment. Once developed, this Corridor can bring revolution in energy & transport sector. The Transport & Infrastructure component of CPEC shall provide an all-weather connection between Gwadar Port and China's north western region of Xianjiang via highways, railways and pipelines.

From Khunjrab to Hakla there is a common alignment. Under APC Conference held on 28th May, 2015 a declaration was announced defining the CPEC Western Corridor as:

Hakla-D.I.Khan-Zhob-Kuchlac-Quetta-Sorab-Hoshab-Gawadar.

Hakla to D.I.Khan project is in implementation phase.

Detailed Design of D.I.Khan-Zhob section is in final stage, done by M/s NesPak.

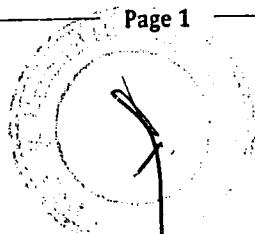
This project pertains to Dualization of Kuchlac to Zhob section of N-50 (305 KM).

National Highway Authority intends to appoint Consultants for Feasibility Study and preliminary design for Dualization of Kuchlac-Zhob section of N-50 (305 km).

1.2 NEED ASSESSMENT:

The proposed road is a part of western alignment of China Pakistan Economic Corridor (CPEC). The National Highway N-50 is an important trade, industrial and agricultural route, connecting many important cities and towns including Kuchlak, Muslim Bagh and Qilla Saifullah. The National Highway N-50 is an important link between the Province of Baluchistan and the Province of Khyber Pakhtoonkhwa. This carriageway after its dualization is expected to become an important link which shall boost trade and facilitate the traffic plying between Zhob Kuchlac and Quetta, also provides further connection with Quetta to Gawadar route in Baluchistan and towns/places in Central Punjab and Khyber Pakhtoonkhwa. 100 m ROW will also be required for this alignment as it is a part of CPEC Corridor.

Jasinda



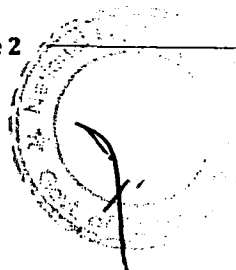
1.3 PROJECT DEFINITION:

Kuchlac-Zhob section of N-50 (305 km) shall be upgraded as four (04) lane dual carriageway. The consultant shall also study the possibility of bypass (where required) and Geometric upgradation of existing road (Where necessary).

1.4 PROJECT OBJECTIVES:

- The proposed 4 lane facility will largely contribute to the economic and social development of Baluchistan, Central Punjab and Khyberpaktoonkhwa
- It will bring more population into the stream of benefits, which in turn will change the social complexion of people around this road.
- Apart from the usual benefits of saving in time this link will transform the entire pattern of transportation in the surrounding areas resulting in uplift of economic condition of local community.
- This route will bring further revolution in road transport and time saving journey for passengers. It will also contribute to ensure smooth and efficient movement of trade, goods and traffic in relatively shorter time.
- The proposed 4 lane facility between Kuchlac and Zhob (305 km) will be a new hub of business for the Baluchistan Central Punjab and Khyber Pakhtoonkhwa.

Asim



CHAPTER NO. 2 DESCRIPTION OF PROJECT

2.1 LOCATION OF PROJECT

The project is located in the Province of Baluchistan. (Location Map attached)

2.2 PROJECT WORKS

Kuchlac-Zhob section of N-50 (305 km) shall be upgraded as four (04) lane dual carriageway. The consultant shall also study the possibility of bypass (where required) and Geometric upgradation of existing road (Where necessary).

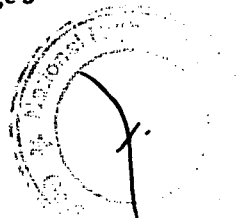
2.3 TIME OF START

The services shall be commenced after immediately after the signing of the contract agreement.

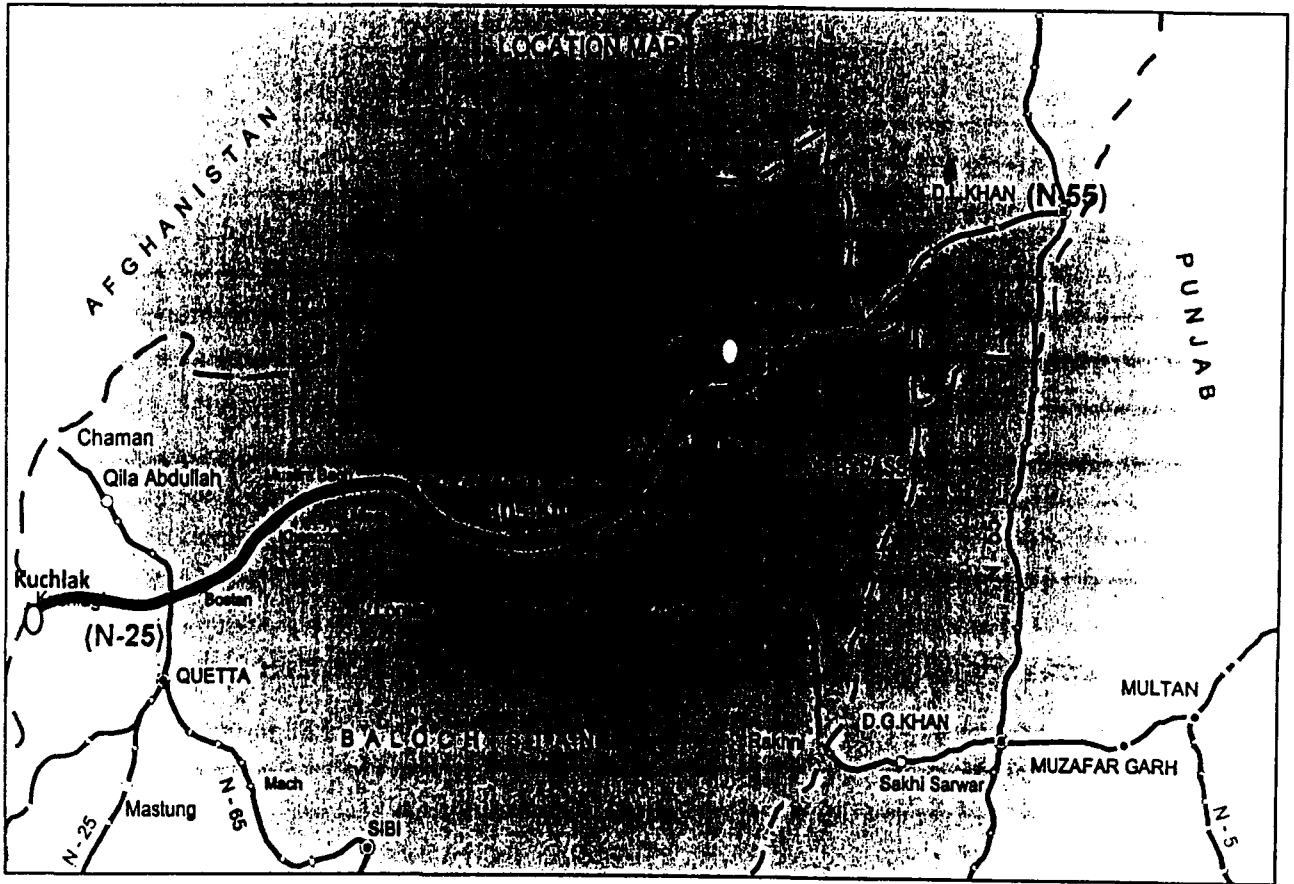
2.4 TIME PERIOD

The services specified in the TOR shall be completed and all relevant reports submitted in the form and format acceptable to the Employer, within four (04) months from the date of signing of Contract Agreement.

U. S. M. S.



LOCATION MAP



CHAPTER NO. 3 & 4

SCOPE OF WORK & DELIVERABLES

The scope of work comprises of following, but not limited to: -

Stage I

- ◆ Data Collection/Co-ordination with all concerned Departments.
- ◆ Desk study on maps & satellite imagery validated by Reconnaissance visit. Satellite image of entire corridor with recommended **options** duly marked on it shall be presented in the Alignment Study Report.
- ◆ Alternate Alignment options with cons & pros, and recommended alignment with comparisons.
- ◆ Presentation of alignment and Cross-section for approval from NHA. *including necessary Geometric improvements.*
- ◆ Traffic count & O&D survey.
- ◆ Inventory for Structures, Bridges and Interchanges after detailed field visit.
- ◆ Study of the project area from hydrology and hydraulics perspective.
- ◆ Feasibility Study with approximate cost estimates on best effort basis.

Stage II and Stage III will be undertaken after the approval of Stage I.

Stage II

- ◆ Detailed topographic survey with cross-sections at 100m intervals.
- ◆ Soil investigation survey on the proposed alignment at every 5km or less, if required.
- ◆ Identification of quarry sites and construction material survey.
- ◆ Design of Toll Plazas, associated buildings, rest areas etc.
- ◆ Geometric Design of highways, interchanges, laybys etc.
- ◆ Road furniture design including traffic signs and gantries. Proposed Location of traffic signs and gantries along the alignment must be shown on the drawings.
- ◆ Structural Design
- ◆ Three days' traffic count at selected nodes to ascertain traffic volumes.
- ◆ Pavement Design with surface and subsurface drainage.
- ◆ Provision of ducts/crossing of future utilities like OFC, pipelines etc.

Stage - III

- ◆ Preparation of EIA Report and obtaining NOC from concerned EPA.
- ◆ Submission of Tender Documents, BOQ, Engineer's Estimate, Take-off sheets for Engineer's Estimate and "C" factor.
- ◆ Stakeout of design alignment after approval for ground validation.
- ◆ Land acquisition & Utility Folders using imageries.
- ◆ Preparation/revisions of PC-1.
- ◆ Training of NHA Engineers at no cost to consultant.

Correctness of Design

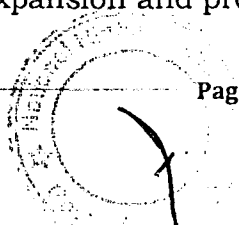
Consultant is entrusted with the Scope of Work outlined above. It is required that the consultant should undertake the job in a professional manner to the best of his ability and resources. NHA as Client may offer comments through in-house review. Any comments offered by the Client do not absolve the consultant 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.

The tasks to be carried out by the consultant are elaborated in the following paragraphs.

Task 1:	Data Collection & Co-ordination.
Outcome:	Consultant gets hold of relevant information, SOP Maps, Satellite imageries and liaison with local department/police etc.

3.1 Data Collection & Co-ordination with concerned departments

Immediately after signing of the Contract, the consultant will get procession of the relevant maps, reports and imageries requires for preparing the design of the Project. After the completion of the design, SOP maps and imageries shall be returned back to the Client in Original and un-damaged condition. In case any authorization is required by the concerned office for delivering the required information, same shall be provided by NHA in the form of *Authority Letter*. The Consultant should inform the local police and administration before conducting all types of filed surveys. Before planning the field reconnaissance, the consultant should co-ordinate meeting with the local city development / Highway Department to know any future plans for city expansion and provincial roads etc.



Task 2:	Reconnaissance Visit with Identification of Alignment Alternatives.
Outcome:	Alignment Study Report.

3.2 Reconnaissance Visit with Identification of Alignment Alternatives

After the completion of the Task 1, the consultant shall carry out the desk study of possible alignments, using maps and imageries. Same shall then be investigated in the field reconnaissance. The site visits shall be carried out by a senior Highway Engineer. Coordinated meetings with local departments shall be done and minutes recorded (same shall be made part of the Alignment Study Report).

During the reconnaissance visit, particular requirements of project shall be identified that will be addressed in the Design. Alignment study report should elaborate the methodologies for detail design for requirements spelled out in the TOR and observations made in the site visit.

After submission of Alignment Report, the Consultant will give his presentation to the Competent Authority for approval of alignment. In the reconnaissance visit, consultant should record some Geographic Coordinates of physical features on ground using GPS (Dual Frequency, high accuracy). It shall be used in geo-referencing/north-rectification of the satellite imageries. Control points shall be fixed not less than 5 km apart.

At the reconnaissance stage Social, Economic and Environmental aspects shall be considered. The resulting information will form part of the recommendations for adoption of a particular corridor. Data from various sources shall be collected at this stage:

- ◆ Topographic Maps
- ◆ Geological Reports available if any (from local departments, adjacent projects)
- ◆ Agriculture Soil Reports
- ◆ Soil Survey Maps (Soil survey of Pakistan)

Task 3:	Detailed Topographic Survey
Outcome:	Submit survey Report. Submit Topographic Plans.

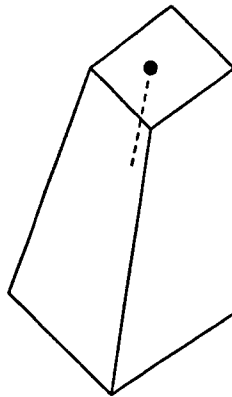
3.3 Detailed Topographic Survey

Topographic survey forms the basis for 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 is desired that the Survey work is of top most order.

As per “Surveying & Mapping Act 2014”, the Survey company must comply with the requirement of the Act. It is therefore recommended that consultant should use the latest technology for the topographic surveys, which include at least 4 (four) GPSDF for establishment of high accuracy control points (as per required plan, specified herein). In case the consultant does not have the requisite number of GPSDF, he is advised to hire services of professional survey companies having the required expertise. A network of control points along the corridor shall be developed involving at least 4 instruments.

Before mobilizing to site for Survey, the Consultant shall submit to the Client detailed topographic survey program with actual human resources *planned to be deployed*, and get



Permanent Ground Monument made of Concrete 1:4:8 with 75 mm steel nail embedded at centre. 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.

approval of **Topographic Survey Program** from NHA. The consultant shall specify *the time line of survey program*. Total number of equipment 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 consultant should change the surveyor. If *consultant 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, and any amendments in the mentioned Act.

3.3.1 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.

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3.3.2 Control for Traverse

Projection: UTM
Datum: WGS84
Vertical Datum: MSL

3.3.3 Horizontal Control

Precise Primary Controls (ITRF CONTROLS)

Minimum four (4) DGPS Primary Controls at start and End of the Project or as many as may be required such that the distance between these points shall not be more than 10 kms. Minimum observation time shall be at least ten (10) hours or as required for each of these points. These points shall be validated/verified with International Fixed Stations in WGS84/ITRF reference frames for an average ambiguity resolution of 50% or better for a reliable network solution.

3.3.4 Primary Controls

DGPS Primary Controls shall be established at a maximum distance of 2.5 kms with one base and one rover using leapfrog method, by applying adjustments to create network. Minimum observation time shall be at least two (2) hours for each of these points. At every 5 kms one additional DGPS point with two (2) hours observation (to form an inter-visible pair) shall be established, which may be used for Total station if needed for topographic survey.

3.3.5 Secondary Controls

DGPS Secondary Controls shall be established at a maximum distance of 333 meters with one base and two rover at alternate sides of Alignment (to form triangular network) using leap frog method, by applying adjustments to create network. Minimum observation time shall be at least 45 minutes for each of these points.

3.3.6 Vertical Control

Vertical Control shall be established using MSL from first order SOP Bench Marks with double run leveling. Digital level with an accuracy of 0.3 mm or less and single section 2m/3m staff or invar staff with change plate on bottom shall be used. The maximum distance between the two successive reading points shall not be more than 50m. All horizontal control points are connected with monuments made for Horizontal primary and secondary controls with double run level to control the height as mentioned above.

3.3.7 Monuments for Horizontal and Vertical Controls

The monuments for controls shall be as per NHA specifications. The ITRF Controls, Primary Controls shall be tied with two permanent points as per NHA Specifications.

3.3.8 Topographic survey (scale 1:1000); including on ground features, buildings, Utilities and Crossing Roads

- a. Topographic Survey will be performed within the ROW Limits. At important control section, if the large-scale structures are proposed to be built on the sections, the survey range can be extended reasonably if necessary. Enough Spot Levels (points) shall be taken to create a topographic map in the scale of 1:1000.
- b. The Consultant is required to observe 10 cross-section across the River Khadir, Bank to Bank. Three cross-sections at the Bridge Site (one center-line and other two adjacent to centerline up and down stream of the bridge. The BM for upon which the Model study survey was done should be incorporated in the traverse/ level circuit.

3.3.9 Centerline Points (stake) and Measurement of elevation of route stake

- a. The distance between the centerline points shall be 20m in general, in case of the pond the stake is fixed on the bank of the inclination and waterline.
- b. The distance between the stakes is 5m-8m on the section of roads which have retaining walls.
- c. The distance between the stakes is 10m on the interchange slip road whose radius is less than 60m.
- d. The distance between the stakes is 5m for the 10m before and after the chainage of the abutment for a total distance of 20m.
- e. Minimum Three longitudinal sections (parallel to Alignment) including the center axis, the left and right edge lines of the bridge shall be measured. For the places where the topography is changed and bridge pier and abutment, more stakes shall be established.
- f. For the culverts, the chainage and elevation of the crossing point shall be measured; the longitudinal section of the water channel 50m upstream and downstream of the crossing point shall also be measured.
- g. The stakes are placed on the edges of the crossed roads. The stakes should be fixed on the crossing points. There is also a need to collect the coordinates, elevation, angle, width and road level of the crossing

points (50m around the crossing point). The coordinates, elevation, and angle of left, middle and right lines of the important crossed roads should be collected (100m around the crossing point).

- h. The position of 10KV high-pressure pole(tower) around the route within 100m, and the power line's lowest elevation on the crossing point
- i. The stake's elevation shall be measured one by one.
- j. It is necessary to establish more stakes in case there is any pipeline or building crossing the alignment; the height difference between the bottom elevation of such pipeline or building and the ground shall be measured

3.3.10 Cross section Points

- a. The cross section should be measured one by one.
- b. The cross section of the embankment should be measured at 100m interval for the straight line sections and curve sections with radius larger than 5,000m. At curves having radius less than $R=5000$ m, the cross sections shall be measured at 20m interval.
- c. The cross section shall be measured to the ROW limit.
- d. For the alignment sections with proposed retaining wall, the cross section shall be measured at 5m interval
- e. For the bridge pier, the measuring range of the cross section is 10m at both left and right sides of the center; for the bridge abutment, the measuring range is till the ROW limit

3.3.11 Interchanges (1:1,000) Map

- a. Extraction of features shall be done & points shall be taken beyond the ROW of 100m and inside the minimum Region defined for Interchanges to create 1:1000 map. The minimum length of existing road to be included in topographic survey (for interchange ramps merging) should not be less than 250 m.

3.3.12 Riverine Survey for Crossing Canals - Short Bridge

Measure the center longitudinal section of the canal from 100m upstream to 50m downstream, and measure the cross section of the canal at 10m interval which is perpendicular to the axis of river. The canal edges must be taken recorded along with all break points to clearly define the canal shape.

3.3.13 Riverine Survey for Crossing Rivers - Long Bridge

In case the crossing of Major River is encountered, sufficient cross-sections shall be required to run the HEC-RAS for computation of water surface profiling. Location of cross-sections shall be as per requirement of the Software.

3.3.14 Survey for Crossing Water Channels/ Nullas

Measure the center longitudinal section of the water Channel/Nullas from 100m upstream to 50m downstream, and measure the cross section of the water channel/nullas at 10m interval, which is perpendicular to their axis. Minimum 5 points shall be taken at each taken at each cross section to correctly depict the top and bottom of the sloping bank, width of bank and center of channel. The distance between the cross section points shall not be more than 5m for wider water channels/Nullas.

3.3.15 Survey corridor

The detailed topographic survey in normal circumstances shall be carried out in a corridor of 100m. At locations of crossing rivers, nullas the detail of survey extent is given in respective sections.

3.3.16 Mapping (Unit of Measurement)

Metric units shall be used throughout.

3.3.17 Scale

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

3.3.18 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
5. Guardrails
6. Road signs

Boundary Features

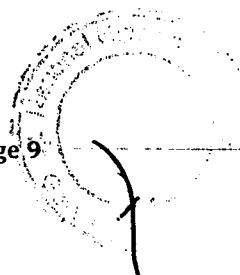
1. Fences
2. Gates
3. Boundary stones located/used for fieldwork
4. Walls
5. Burial grounds
6. Historical areas

Railways

1. Gauge faces of railway running rails with elevations of rail top
2. Level crossings
3. Platforms
4. Bridges (over road, river, etc.)
5. Station building
6. 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. Rock outcrops
6. Mining tips
7. 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 1.0m 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

3.3.19 Bridge details

The bridge details shall be shown on a separate drawing for each bridge. 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 ridge (with respect to the road centerline passing underneath) showing all the relevant levels, offsets and skew angle.

11

Culvert details

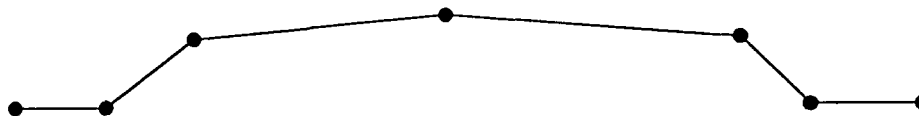
Details of each culvert are to be shown on the survey plans and a separate sheet with tabulation of the following information is to be submitted with the plans: -

- 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.

Existing Road/embankment

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.



3.3.20 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 changes 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

3.3.21 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. Before processing the data, it is important to run the data filtration. All data points with incorrect x, y or z values shall be removed. It is also important as well to properly identify the break lines like road, nullah edge with natural faults. Void areas like buildings shall also be marked. The topography shall be fully labeled for every object recorded.

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. Using the recorded data in x,y,z format on data logger, the ground surface over the required area shall be simulated by strings of coordinated information along characteristic lines on the terrain. 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.

The Surveyor shall obtain prior approval from the Client for any strings that are to be digitized but that do not absolve the Surveyor from the subsequent accuracy and definition of the model. TIN (Triangular irregular network) shall be developed by using software. Using TIN, Contour generation shall be done.

3.3.22 Grid

The coordinates of the DGM shall be in Easting, Northing and elevations.

3.3.23 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.

3.3.24 **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.

3.3.25 **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.

During data collection, break lines on the ground should be very well picked that affects the contour generation.

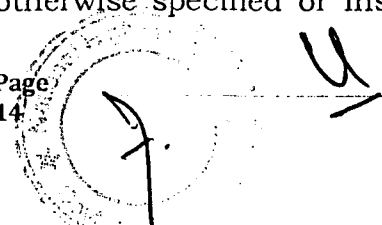
If in the project, where steep slopes are likely to be encountered, the surveyor is required to use the laser equipped total stations that does not require and prism to record the co-ordinates.

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.

Where because of undergrowth, on-going earthworks, swampy areas, or other obstructions, the ground surface is obscured, or access is restricted, and provided the Client prior agreement is obtained, contour can be shown by broken lines to indicate that their accuracy cannot be guaranteed.

3.3.26 **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 1:100 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.

3.3.27 Original Drawings & Preliminary Copies

Preliminary copies shall be submitted in the form of stable based paper. Every sheet of the drawings shall be marked as preliminary copy along with the date of submission, until the final approved copy which shall be marked as "Final Tender Drawings". Each drawing shall be stamped and signed by the Designer.

3.3.28 Soft Submission of Data and Drawings

The Surveyor shall supply the digital ground model data, All Drawings, Reports suitable for input to the computer specification acceptable to Client. 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.

3.3.29 Field Books and Record

All field books and computer data must be properly kept and shall record truthfully all the survey work carried out. The Surveyor shall do all workings in proper books, adequately in good style and according to best practice. All field books shall be done in ink. Unsatisfactory works and errors shall be struck off and there shall be no superimposed writing or erasure. Client's Representative may check the field books now and then to ensure that a high standard of work is maintained. He may request the Surveyor to carry out some spot checks if he has reasonable doubt on the accuracy of the survey work. The Surveyor shall comply with such requests unless he can prove to the client's representative for his satisfaction that such checks are unnecessary. All field books and computer data shall be certified by the qualified surveyor.

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.

3.3.30 Geometric Design Standards

Geometric Design Standards shall be as per latest policy of AASHTO on Geometric Design of Highways & Streets. Salient design

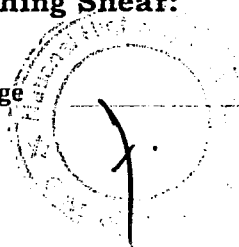
parameters are proposed as following. Consultant may suggest improvements as per site conditions/constraints: -

Design Element	Unit	Standard
No. of lanes	-	04
Lane width	m	3.65
Design speed	KPH	90-100 kph
Paved shoulder	m	3.0m outer and im inner
Pavement cross-slope	%	2.0
Shoulder	%	4% outer and 4% inner
Max super elevation.	%	6
Min. vertical clearance over road	m	5.2
Min. vertical clearance over railway line.	m	7.0
Right of way.	m	100

3.3.31 Standards for Structures

For analysis and design of structures, latest versions of the following codes and standards will be adopted.

- **AASHTO-(LRFD): -**
For analysis and design for all loads and load combinations.
- **West 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 seismic 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 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 AASHTO.

3.3.32 Existing Structures (if applicable)

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, along with two photographs of each existing structure will be submitted.

Structural Analysis

Structural Analysis shall be performed using licensed/genuine international software. All input files shall be made a part of the Design Report.

River Training Works (If required)

If any Guide Banks, spurs and protection works are required then these shall be designed in the light of Model study report for high flood discharge and flow pattern determined by design calculations and hydraulic model study.

3.3.33 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 latest version of AASHTO Road Side Design Guide shall be followed.

Task 4:	Traffic & Axle Load Survey
Outcome:	Classified Traffic Surveys after approval of Client. Submit Traffic & Axle Load Survey Report.

3.4 Traffic & Axle Load Survey

Traffic count forms the basis for capacity analysis, pavement design and economic analysis etc. consultant 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 consultant shall submit proposed program of traffic count along with locations, duration and repetitions. Same shall be exercised after the approval of the Client. The classified traffic count shall include following classifications:

- Non motorized traffic Animal drawn, bicycle
- Motorized traffic M/cycle, Car/Pickup/Jeep,
 Minibus/wagon, Bus, 2-Axle, 3- Axle,
 4-Axle, 5-Axle, 6-Axle, Tractor trolley

The traffic count shall be done with hourly classification. In peak hour, 15-minute interval count shall be done to ascertain PHF.

Journey Time

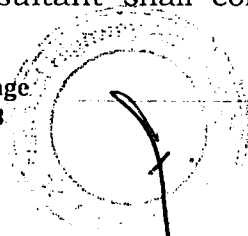
For with and without Project scenario, the journey time survey of various classes of vehicles in peak hours and off peak hours shall be done. It shall be used in economic analysis

Origin & Destination Survey

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

Axle Load Survey

Consultant shall undertake axle load survey using portable weighing machine. Consultant 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.

Underpass/Cattle Creep Survey

Using satellite imageries, field survey and site consultation, consultant shall identify exact number & locations of the underpass/cattle creep survey to be provided for convenience of local residents.

Traffic Diversion Plans

Traffic Diversion Plans shall be provided for the following situations:

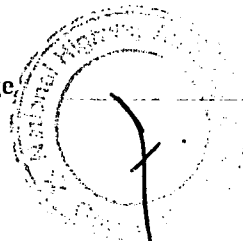
- a. At toll plazas
- b. At Intersections and interchanges
- c. In urban areas including methodology for separating the local and through traffic.
- d. On at-grade railway crossings.
- e. At places where underground construction like construction of box culverts and underpasses, proper traffic diversion plans shall be provided.
- f. At places where overhead bridge construction is likely to take place, proper traffic diversion plans shall be provided.

Consultant shall fully define the methodology for construction sequence, diverting traffic and maintaining the diversion roads.

Task 5:	Soil & Material Investigation Report
Outcome:	Soil and Material Investigation Report

3.5 Soil & Material Investigation

Soil & Material is shall be done to ascertain the index and engineering properties of soil & rock encountered. The consultant 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. 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

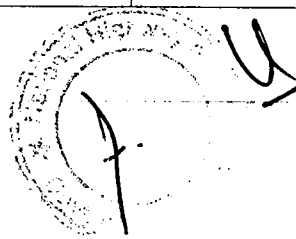
- Investigation to determine the source and quantity of naturally-occurring construction materials
- Examine specific sites such as deep cuts, retaining walls and culverts etc.

Following table presents the guidelines for the quantity of roadway pits or borings and testing required for the Final Design Report. The values given are average investigation requirements for normal highway work and that actual scope will depend upon the complexity of the problem.

Roadway type	Height (m)	Terrain type	Spacing (m)	Depth (m)
Embankment	<2	Uniform	1000	1.0
		Rolling	500	
		Hilly	250	
Embankment	2-10	Uniform	500	1/3 of embankment of refusal
		Rolling	400	
		Hilly	200	
Embankment	>10	Uniform	600	2/3 of embankment of refusal
		Rolling	300	
		Hilly	150	
Cut	<2	Uniform	1000	1.0 below subgrade
		Rolling	500	
		Hilly	250	
Cut	2-10	Uniform	800	1.0 below subgrade
		Rolling	400	
		Hilly	200	
Cut	>10	Uniform	600	1.0 below subgrade
		Rolling	300	
		Hilly	150	

Guidelines for testing requirements are given below:

Test	TEST REQUIREMENT		FREQUENCY	
	EMBANKMENT	SUBGRADE	ALIGNMENT	BORROW AREA
Gradation	•	•	1 per km	1 per boring/ pit
Moisture Content	•	•	1 per km	1 per boring/ pit



Classification	•	•	1 per km	1 per boring/ pit
Moisture Density	•	•	2 per 5 km	1 per borrow area
CBR	-	•	1 per 1 km	1 per borrow area

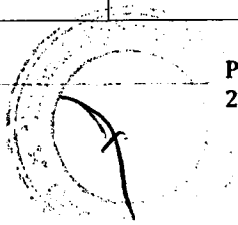
For testing of materials, following codes and standards shall be followed:

- a) ASTM - American Society for Testing & Materials.
- b) AASHTO - American Association of State Highway and Transportation Officials.

3.5.1 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.

Test	Test Requirement					
	Fine Aggregate		Coarse Aggregate			Water
	Asphalt Concrete	P.C. Concrete	Subbase/ Base	Asphalt Concrete	P.C. Concrete	
Gradation	•	•	•	•	•	
Atterberg Limits	•		•	•		
Sulphate Soundness	•	•	•	•	•	
Loss by Abrasion			•	•	•	
Organic Impurities		•				
Sand Equivalent		•	•	•		
Soluble Sulphates		•			•	
Soluble Chlorides		•			•	
Friable Particles		•	•	•	•	



Handwritten signature or initials.

Thin & Elongated Particles			•	•	•	
Fineness Modulus		•		•		
Water Quality						•
Marshall Test				•		
Stripping Test				•		

Water is required for 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.

3.5.2 Soil Classification

Soil description is necessary for all test pits and boring logs. The descriptions should be standardized so that the main characteristics are given in the same order i.e. *Mass Characteristics* shall include field strength, moisture content, bedding state if applicable discontinuities and state of weathering. *Material Characteristics* shall cover Color, Composition, and grading. Particle shape, soil name and soil group. Both Unified and AASHTO classification shall be used.

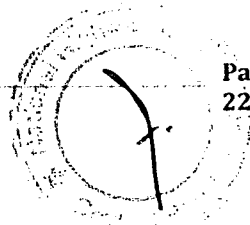
Task 6:	Environmental Impact Assessment Study
Outcome:	EIA Report submission and obtaining NOC.

3.6 EIA

Consultant is required to carry out the EIA Study for the Project. It involves, but not necessarily limited to, collection of required data from site, formulation of Report, getting it reviewed from NHA EALS Section, finalization of EIA Report as per requirements of the concerned EPA, addressing the requirements of EPA to their satisfaction (including submission fee), conducting the hearing/presentation including allied expenditures and obtaining NOC.

For EIA, Consultant shall directly coordinate with GM (EALS) office. The vetting of the EIA Report, and verification of invoices etc. shall be dealt by the office of GM (EALS).

4



Task 7:	Pavement & Structural Design
Outcome:	Design Report

3.7 Pavement & Structural Design

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 consultant shall get the basic design from latest version of AASHTO Pavement Design Guide, 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 shall be used. Kenlayer analysis software shall be used. Non-linear elastic approach shall be employed. All calculations shall be attached in the report.

For design of structures, design codes, standards specified in earlier section of the TOR shall be followed.

A combined report on geometric, pavement, and structural design shall be submitted to NHA.

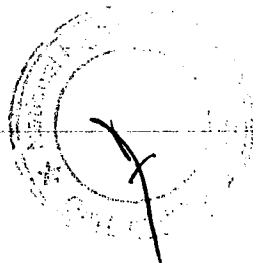
Task 8:	Hydrology & Hydraulic Study
Outcome:	Hydrology & Hydraulics Study Report

3.8 Hydrology & Hydraulic Study

3.8.1 Objective

The objective of the hydrological and hydraulic study is to mathematically model the project area to design cross drainage structures and road embankment height to protect it from future floods. The major objectives are:

- Establishment of Waterway
- Marking extents of the catchments' area along with its characteristics
- Calculating Maximum Peak Flood Discharge based on meteorological data.
- Marking of flood plains and High Flood Levels
- Location of Cross Drainage structures
- Hydraulic Design of Cross Drainage structures (Type, sizes / geometry and Energy dissipaters for erosion control etc.)
- Calculating Scour Depth for bridges



3.8.2 Scope of Work / Activities

The consultant shall adopt state-of-the-art mathematical modeling approach using industry-standard software's for the hydrological and hydraulic assessment that shall incorporate following activities:

a. **Reconnaissance Survey**

The field survey will include geo-tagged photographs of the existing cross drainage structures, measurement of structure sizes; evaluation of structural condition, general soil evaluation and land use in the area. In case there is track alignment, all possible locations of water crossings shall be identified with water marks and width of waterway.

b. **Meteorological Analysis**

The meteorological analysis shall be based on maximum available record (preferably more than 30 years) from all the surrounding observatories. The analysis must include;

- Review and analysis of historic Rainfall and Peak Storm events;
- Use of statistical methods to evaluate meteorological and hydrometric records and determining best data best fitting on either of Gumbel Max, Weibull or Log Pearson 3 distributions.
- Calculation of return periods for 25 years, 50 years, 100 years and for bridge 500 years.
- Instead of using meteorological station data far away from the road, the consultant shall use spatial analysis (for meteorological models) for finding out design storm value in the study area / watershed derived from the surrounding observatories.
- Selecting and calculating design storm for hydrological model

c. **Watershed Delineation**

The activity includes delineation of watershed affecting road and evaluating physiography and topography of the catchment / watershed-area. The watershed delineation shall be carried out using industry standard GIS software's like ArcHydro, Topaz, WMS and DHI MIKE suite etc. The digital elevation model (DEM) for watershed delineation shall be of at least 30meter resolution or better. Satellite imagery and any available topographic survey shall be used for stream / river correction in the DEM.

d. **Soil and Land Use**

The hydrological soil type and land use shall be assessed in the catchment to evaluate Loss, routing and roughness. The hydrological soil

type and land use may be marked using satellite imagery and classification methods available in GIS with spot site verification.

e. Surface Runoff Model

The surface runoff for all ungauged basins shall be calculated using “Hydrological Modeling System” (HEC-HMS) and Watershed Modeling System (WMS) for large basins and for small TR-20 can be used. The model shall be prepared using GIS techniques / software like HEC-GeoHMS and WMS etc. The preparation shall include complete sub-basin characterization like basin area, slope, roughness and lag-time etc. The preferred method is as follows:

- Land use marked according to Anderson method / Land use type
- Loss Method = SCS Curve No.
- Roughness = Manning’s n
- Transform SCS Unit Hydrograph
- CN curve numbers estimated from Land use
- Muskingum-Cunge or dynamic for routing
- Streams sections estimated from DEM

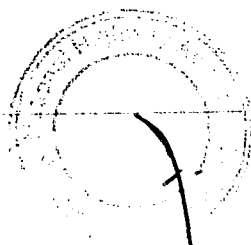
The hydrological model shall be integrated into hydraulic model based on field survey and judgment, stream and cross drainage structures identification through imagery and marking streams through GIS methods.

The consultant may also take into consideration future catchment changes likely to influence flooding risk.

f. Hydraulic Analysis

The calculated storm flows shall be modeled through or around road structures using 1D models like HEC-RAS, HY-8, MIKE 11 and SWMM. The culverts in general shall be designed using HY-8 based on data prepared through “Watershed Modeling System” and field survey. The bridges and mapping of flood plains shall be carried out through 1D hydraulic models like HEC-RAS or MIKE 11. The hydraulic model shall be prepared using GIS techniques like HEC-GeoRAS, WMS or MIKE 11.

The hydraulic model results shall be used for assessment of flood impact and analysis of alternatives for its mitigation. The hydraulic structures shall be designed taking into account standard design criteria for highways.



Functional classification and structure type	Design AEP					Check Flood
	50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)	1% (100-yr)
Freeways (main lanes):						
Culverts					X	X
Bridges*					X	X
Principal arterials:						
Culverts			X	[X]	X	X
Small bridges*			X	[X]	X	X
Major river crossings*					[X]	X
Minor arterials and collectors (including frontage roads):						
Culverts		X	[X]	X		X
Small bridges*			X	[X]	X	X
Major river crossings*				X	[X]	X
Storm drain systems on controlled access highways (main lanes):						
Inlets, drain pipe, and roadside ditches			X			
Inlets for depressed roadways*					X	
Storm drain systems on other highways and frontage roads:						
Inlets, drain pipe, and roadside ditches	X	[X]	X			
Inlets for depressed roadways*				[X]	X	
+ The 0.5% (200-yr) and 0.2% (500-yr) AEP events should be calculated for scour computations.						

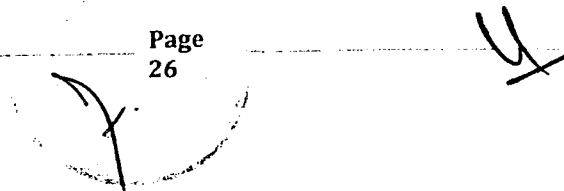
All structures must be evaluated to the 1% Annual Exceedance Probability (AEP) flood event or 100yr return period. Selecting a design flood is a matter of judgment; it requires balancing the flood risk with budgetary constraints, therefore the consultant is required to submit its proposal and take approval from national highway authority. The designer should design a facility that will operate:

- Efficiently for floods smaller than the design flood.
- Adequately for the design flood.
- Acceptably for greater floods.

3.8.3 Outputs / Reporting

The following reports shall be submitted by the consultant: -

1. Reconnaissance survey report;
 - a. The Visit report shall include geo-tagged pictures in soft form.



2. Layout of structures:
 - a. marked on satellite imagery
 - b. marked with respect to catchments
3. Draft report
 - a. Detail watershed delineation and analysis
 - b. Meteorological analysis
 - c. Soil and land use classification
 - d. Surface runoff model results
 - e. 1D hydraulic model results for design
 - f. Hydraulic design of structures
 - g. Embankment height according to HFL
4. Final report

Task 9:	Highway Safety Audit
Outcome:	Highway Safety Audit Report

3.9 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 audit the design from highway safety perspective and furnish his observations/remarks in the form of a Report. The Auditor may like to conduct meeting with the consultant to discuss his observations. He may also like to visit the project alignment. The consultant will be required to appropriately address the observations and extend full support in completion of the highway safety audit. It is highlighted that highway safety audit shall not absolve the consultant from his responsibility for safety, suitability, and soundness of the project design.

Task 10:	Stakeout of Design Alignment
Outcome:	Approval from Field Formations

3.10 Stakeout of Design Alignment

The Consultant will be required to stake the alignment on ground. The Centreline markers shall be fixed on ground at every 25 m interval. Approval/verification shall be made by the field formations of NHA.

Task 11:	Land Acquisition & Utility Folders
Outcome:	Land Acquisition & Utility Folders

3.11 Land Acquisition & Utility Report

The consultant 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 consultant, upon request. The Consultant shall also prepare estimate for acquiring any additional and removal of structures and utilities, particularly in the built up areas. Folders shall also be submitted in soft format in CAD with reference to grid coordinates.

Task 12:	Construction Machinery Report
Outcome:	Construction Machinery Report

3.12 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 to be imported shall be reflected in the foreign currency portions of the cost estimates and PC-I.

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Task 13:	Formulation of PC-I
Outcome:	Submission of PC-I

3.13 Formulation of PC-I

The Consultant shall formulate the PC-I for the project road sections including economic analysis on prescribed Performa of PC-I by Planning Commission.

Task 14:	Tender Documents
Outcome:	Submission of Tender Documents

3.14 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. The consultant will be required to submit complete take-off sheets in editable format for "C" factor along with bidding document.
- 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 earth retaining structures
- 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.
- Drawings related to Environmental Mitigation Measures

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

Consultant shall prepare comprehensive Bill of Quantities to be calculated to accuracy of $\pm 5\%$ encompassing all the items of work, properly cross referenced to the Technical Specifications. Standard format of Bill of Quantities shall be adopted. BOQ must be submitted along with editable soft copy of take-off sheets.

h. Construction Drawings

The Consultant shall prepare construction drawings (Contract Plans) in a clear, concise and uniform manner in Digital Format using AutoCad / Civil 3D. 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 consultant 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.

j. Engineer's Estimate

Consultant shall prepare the Engineer's Estimate of the project based on the project design, drawings and final Bill of Quantities, using latest available Composite Schedule of Rates. For items not specified in NHA **CSR**, rate analysis shall be provided based upon market price. The consultant

will be required to submit complete take-off sheets in editable format along with Engineer's Estimate.

3.15 Final Presentation

Consultant 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) Consultant 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) Consultant 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) Consultant 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 full along the finally selected alignment shall be presented.

- B Requiring improvement
- Poor Poor

d. "B" performance rating without subsequent improvement shall drop the consultant 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.

3.19 Assistant in Audit

The consultant will be required to assist NHA in addressing the audit observations, at any stage, related to project design.

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Mode of Payment:

S. No.	Activity	Percentage of Contract amount, excluding Provisional Sums	PS (Rs)
1.	Task 2: Alignment Study Report.	5	
2.	Task 3: (i) Survey Report, (ii) Topographic Plans	10	
3.	Task 4: Traffic & Axle Load Survey Report	10	
4.	Task 5: Soil and Material Investigation Report	15	
5.	Task 6: EIA Report and NOC	0	1.0 Million
6.	Task 7: Design Report	15	
7.	Task 8: Hydrology & Hydraulics Study Report	0	5.0 Million
8.	Task 10: Stakeout of design alignment	5	
9.	Task 11: Land Acquisition & Utility Folders	5	
10.	Task 12: Construction Machinery Report	5	
11.	Task 13: PC-I	10	
12.	Task 14: Tender Documents	20	
13.	TOTAL	100	

Upon submission of Reports, 50% payment shall be released. Remaining shall be released upon acceptable quality is ensured. Upon initial submission, a checklist correlating to TOR requirement shall be attached and checked for requirement spelled out. Final payment shall not be cleared until Consultant gives a satisfactory final and until consultant submits editable copies of all documents/reports/drawings.

Requirement of Staff:

S. No.	Position	Nos.	Man Months
1.	Team Leader / Senior Highway Engineer	1	4
2.	Senior Structural Engineer	1	4
3.	Pavement/Traffic Engineer	1	2 ✓
→ 4.	Material Engineer	1	2
5.	Quantity Surveyor	1	3 ✓
6.	Chief Surveyor	1	3 ✓
7.	CAD Operator	2	4 ✓
8.	Computer Operator	2	4 ✓
9.	Surveyor	2	2

The above requirements are tentative. Consultant may give suggestions in technical proposal and pre-bid meeting.

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Annex-T1

**INFORMATION FOR
FIXED TRAVERSE
STATIONS**

**Name of Traverse
Stations:**

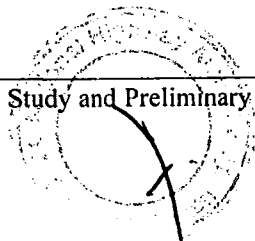
Northing: _____

Easting: _____

Elevation: _____

Affix Photograph of Traverse station

**Sketch of the fixed
traverse stations with
reference to permanent
features**



CHAPTER NO. 5

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 ecosystems, 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.

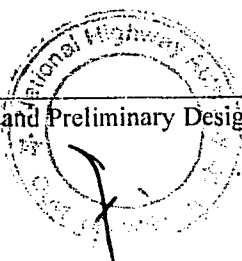
The parameters need to be monitored include Ozone (O₃) Carbon monoxide (CO) Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), and particulate matter (PM₁₀). Acceptable standard analysis methodology should be selected to measure the NEQS parameters.

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 20°C, 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, consultant 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%
(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 Three (03) months from the date of Date of Commencement of Services.