



NATIONAL HIGHWAY AUTHORITY

Procurement & Contract Administration Section

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

No. 6(492)/DIR-III(P&CA)/NHA/2020/11

Islamabad ..10th January, 2020

Director General

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

Subject: **ANNOUNCEMENT OF EVALUATION REPORT (PPRA RULE-35):
Consultancy Services for Feasibility Study and Detailed Design
for Construction of 4-Lane Flyover at Bara-Kahu N-75 (3.5 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.


(SAJJAD ALI SHAH)
10/01/2020
Director (Consultancy) P&CA

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

Copy for kind information to:

- Member (Planning), NHA, Islamabad;
- General Manager (P&CA), NHA, Islamabad;
- Director (MIS), NHA, Islamabad.

EVALUATION REPORT

(As Per Rule 35 of PP Rules, 2004)

1.	Name of Procuring Agency:	National Highway Authority
2.	Method of Procurement:	Single Stage Two Envelope Procedure
3.	Title of Procurement:	Consultancy Services for Feasibility Study and Detailed Design for Construction of 4-Lane Flyover at Bara-Kahu N-75 (3.5 Km)
4.	Tender Inquiry No.:	6(492)
5.	PPRA Ref. No. (TSE):	TS402080E
6.	Date & Time of Bid Closing:	29 th October, 2019 at 1130 hours local time
7.	Date & Time of Bid Opening:	29 th October, 2019 at 1200 hours local time
8.	No of Bids Received:	Six (06) Proposals were received
9.	Criteria for Bid Evaluation:	Criteria of Bid Evaluation is attached at Annex-I
10.	Details of Bid(s) Evaluation:	As below

Name of Bidder	Marks			Evaluated Cost (EC)* (PKR)	Rule/Regulation/S BD**/Policy/ Basis for Rejection / Acceptance as per Rule 35 of PP Rules, 2004.
	Technical (if applicable)	Financial (if applicable)	Total (out of 1000)		
1) M/s Associated Consultancy Centre (Pvt.) Ltd. in JV with M/s ACE Ltd., M/s Finite Engineering (Pvt.) Ltd. & M/s ECOS (Pvt.) Ltd.	609	200	809	7,867,425	Top scoring firm in combined evaluation (PPRA Rule 36(b) (ix))
2) M/s NESPAK (Pvt.) Ltd. in JV with M/s HAZRA Consulting (Pvt.) Ltd.	617	96	712	16,457,200	2 nd
3) M/s EA Consulting (Pvt.) Ltd. in JV with M/s Techno Legal Consultant (Pvt.) Ltd.	619	71	690	22,115,000	3 rd
4) M/s MM Pakistan (Pvt.) Ltd. in JV with M/s CECON	546	Financial Proposal not opened			PPRA Rule 36(b) (v)



EVALUATION REPORT

(As Per Rule 35 of PP Rules, 2004)

Name of Bidder	Marks			Evaluated Cost (EC)* (PKR)	Rule/Regulation/S BD**/Policy/ Basis for Rejection / Acceptance as per Rule 35 of PP Rules, 2004.
	Technical (if applicable)	Financial (if applicable)	Total (out of 1000)		
5) M/s Exponent Engineers (Pvt.) Ltd. in JV with M/s PEAS Consulting (Pvt.) Ltd. and M/s ESS-I-AAR	Non Responsive				PPRA Rule 36(b) (v)
6) M/s A. A. Associates in JV with M/s Asif Ali Associates (Pvt.) Ltd. and M/s ECSP (Pvt.) Ltd.	Non Responsive				-do-

*EC is the Evaluated Cost used for evaluation purpose and includes only the cost of competitive component (i.e. Remuneration and Direct Non-Salary Cost) and is exclusive of Provisional Sum, Contingency and Indirect Taxes.

Top Ranked Bidder: M/s Associated Consultancy Centre (Pvt.) Ltd. in JV with M/s ACE Ltd., M/s Finite Engineering (Pvt.) Ltd. & M/s ECOS (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:.....

Official Stamp:.....



**Standard Bidding Documents (SBD).

National Highway Authority



Annex-I Criteria *FOR* Bid Evaluation

**Consultancy Services for Feasibility Study
and Detailed Design for Construction of
4-Lane Flyover at Bara-Kahu N-75 (3.5 Km)**

January, 2020



NATIONAL HIGHWAY AUTHORITY

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

Ref: 6(492)/Dir-III (P&CA/NHA/2019/25/

Dated: 25th October, 2019

To

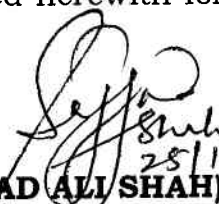
All Prospective Consultants

Subject: **CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED DESIGN FOR CONSTRUCTION OF 4-LANE FLYOVER AT BARA - KAHU N-75 (3.5KM).**

“MINUTES OF PRE-PROPOSAL MEETING ”

Reference: Pre-Proposal meeting on the subject held on 10th October, 2019.

Minutes of Pre-Proposal Meeting alongwith Addendum No.1 being integral part of RFP for the subject services are enclosed herewith for necessary action, please.


25/10/19

(SAJJAD ALI SHAH)

Director (Consultancy)P&CA

Enclosure:

- **Minutes of Pre-Proposal Meeting (04 Pages)**
- **Addendum No.1 (03 Pages)**

Copy for information to:

- Member (Planning), NHA, Islamabad
- Member (Engineering-Coordination), NHA, Islamabad.
- General Manager (Planning), NHA, Islamabad.
- General Manager (P&CA) NHA, Islamabad
- General Manager (Design) NHA, Islamabad.
- Dy.Director (P&CA-II) NHA, Islamabad.
- AD (P&CA-I) NHA, Islamabad.

**MINUTES OF PRE-PROPOSAL
MEETING HELD ON 10th OCTOBER 2019**

**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED
DESIGN FOR CONSTRUCTION OF 4-LANE FLYOVER AT BHARA –
KAHU (N-75)**

A Pre-Proposal Meeting was held in NHA Auditorium at 1100 hours on 10th October 2019 to discuss the Request for Proposal (RFP) for subject Services. Following NHA officers and representatives of prospective consultants attended the meeting:

▪ **National Highway Authority**

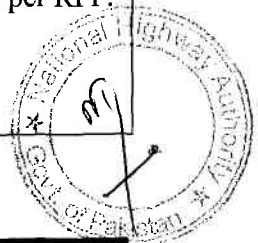
- Ms. Ayesha Tariq ... for General Manager (Planning)
- Ms. Saba Ejaz ... for General Manager (Design)
- Mr. Sajjad Ali Shah ... Director (P&CA) – III
- Ms. Sadia Rehman ... Deputy Director (P&CA) – II
- Ms. Mateen Raana Kazmi ... Assistant Director (P&CA) – I

▪ **Consultants**

- Mr. Haris Aqil ... GM, M/s EA Consulting (Pvt.) Ltd.
- Mr. M. Bilawal ... HR Assistant, M/s MM Pakistan (Pvt.) Ltd.

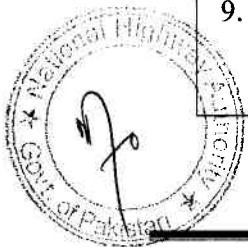
2. The queries submitted during the above-mentioned pre-proposal meeting and their clarifications/ replies are summarized below for information of all prospective bidders:

Sr. No.	Queries	Reply
1.	Refer Clause 1.7(v) of Data Sheet on page-11 of the RFP, the Consultant has to engage a new less experienced firm having minimum share of 20%. It is requested that minimum specified should be reduced to 10% keeping in view the possibility that new firm may not provide personnel for its due share and the responsibility would be shared by the established firm.	Not acceded to. Please proceed as per RFP.
2.	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.



[Handwritten Signature]

Sr. No.	Queries	Reply
3.	Please refer to Clause No. 4.4 of the Data Sheet on page 15. It is requested that the date of submission of proposal may kindly be extended for another one week minimum ending on 5th November 2019 for preparation of sound and creditable proposal and arrangements of collaboration/ JV with other experienced firm.	Not acceded to. Please proceed as per RFP.
4.	It is our understanding that all primary / secondary data would be delivered to the successful Bidder/Consultant prior to commencement of the assignment in case of award of contract and access to the site shall be ensured without any halt.	Not Acceded to. Proceed as per Task-I, Chapter# 3 of ToR.
5.	Refer 3.1.2 b on page 05 of the RFP, we understand that the total number of the man months given in the relevant table are to be adjusted according to the requirement of experts for their anticipated inputs on their part. So it is assumed that the given man months in the RFP will not be considered as fixed due to variation.	Please proceed as per RFP.
6.	Refer to Table of Man-Power Requirement on page 92 of the RFP, wherein, it has been observed that the individual Man-months indicated for Highway Engineer (01 mm), Hydraulic/Drainage Engineer (0.5 mm), Electrical Engineer (01 mm), Highway Safety Engineer (01 mm) and GIS Expert (0.5 mm) as key personnel are quite less to render their relevant technical services. It is requested to please enhance these man months to double.	Not acceded to. Please proceed as per RFP.
7.	What is the estimated budget of this project?	You are advised to make your own assessment.
8.	The criteria for academic qualification and their professional experience of consultant's staff as mentioned in the RFP / TOR appears to be stringent to meet the requirements which may kindly be relaxed.	Not acceded to. Please proceed as per RFP.
9.	Interfacing arrangements with the concerned agencies for relocation of existing utilities or any-other useful data for the purpose of detailed design and other associated activities, may please be ensured. Please clarify.	Refer to Task-1 of Chapter # 3. All correspondences have to be carried out by Design Consultant. However, if needed the client may provide assistance in coordination.






Sr. No.	Queries	Reply
10.	The location map of the project given on page 49 of the RFP is not visible which doesn't reflect the surrounding features and the alignment of the existing road around the vicinity of the proposed prospect/project.	Please See Annexure-I to Addendum No. 01.
11.	In our opinion, we feel short of expertise of Sr. Sociologist for safeguard/LAR issues and Contract Engineer for contract/bidding documents which need inclusion in the Key Staff list to render their requisite technical services.	Proceed as per ToR.
12.	Refer to Page 47 of the RFP, Paragraph 1.3: It is requested that any traffic studies carried out in the past by NHA should be provided.	Not acceded to. Independent studies have to be carried out.
13.	Refer to Page 49 of the RFP, Paragraph 2.1: Please indicate the start point and end point on the alignment map.	The project length is tentative and the ramps end shall be decided by Design Consultant.
14.	Refer to Page 50 of the RFP, Paragraph 2.4: It is requested that the time period mentioned be extended from 4 months to 6 months.	Proceed as per ToR.
15.	Refer to Page 86 of the RFP, Paragraph 3.23: It is requested that under Stage-I, the mode of payment should be 10% each at the submission of Inception Report and Alignment Study Report.	Not acceded to. Please proceed as per RFP.
16.	Refer to Page 87 of the RFP, Paragraph 3.23: In Stage-III, the sub-total should be limited to 20% instead of 40% payment as the Stage-III is simply preparation and submission of documents. This would ease the cash flow of the Consultant, because the Consultant is not provided any advance such as Mobilization for carrying out the assignment.	Not acceded to. Please proceed as per RFP.
17.	Refer to Page 92 of the RFP: It indicates at Sr. No. A1 that the Team Leader/Senior Highway Engineer man-months, however, it conflicts with Page 12 of the Data Sheet, 3.14 where under key personnel, it is indicated as "Team Leader/Sr. Structural Engineer". We consider that it should be Team Leader/ Sr. Structural Engineer. Please clarify.	Its team leader/ Senior Structural Engineer. Please see Annexure-II to Addendum No. 01





Sr. No.	Queries	Reply
18.	Refer to Page 74 of the RFP: Under the Task 7, it is mentioned that the Consultant will seek NOC from PEPA. Please note, that to seek approvals from other agencies such as PEPA should be the responsibility of Client and not the Consultant. Kindly review this requirement.	Not acceded to. Please proceed as per RFP

.....

ADDENDUM No.1**Consultancy Services for Feasibility Study and Detailed Design for Construction of 4-Lane Flyover at Bhara-Kahu (N-75) (3.5-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. Appendix-A: TERMS OF REFERENCE (TOR)

- (i) Refer page-47, please read Clause 1.3 Traffic Plan of Chapter No. 01 (Introduction), in addition to the following information:

“As per NHA planning, existing Shahdara road with 3.5 meter width will be adopted upto 1.0 Km and then turned on to the existing Kiani Road; having rigid pavement of 6.0 meter width (CDA constructed road) for another 1.0 Km. Further to it, the available land, already acquired by CDA for construction of bypass (old plan) will be utilized. This shall ultimately join the existing Bhara Kahu road at 8+500 (Ghugi Stop). The tentative length of bypass comes out 3.5 Km.

In this section, there is an existing bridge on nullah with a narrow width of 5.0 meters (approx.). This bridge is in deplorable condition and cannot be used by heavy traffic, therefore, needs proper rehabilitation. However, another temporary baily bridge or as otherwise proposed by Design Consultant is required to be constructed parallel to the existing in order to facilitate two way traffic. The construction of bypass on the entire length of diversion starting from Shahdara intersection upto Ghugi Stop, as a 4-Lane temporary facility to be used for every type of traffic till the completion of project, will be a part of the proposed project.

All sort of coordination, if required any, for finalizing the diversion plan, shall be dealt by the Design Consultant with CDA and other local departments.

Imagery is attached at **Annexure-I to Addendum No. 01**. However, it is pertinent to mention that alignment is tentative and Design Consultant has to provide suitable option as per TOR.

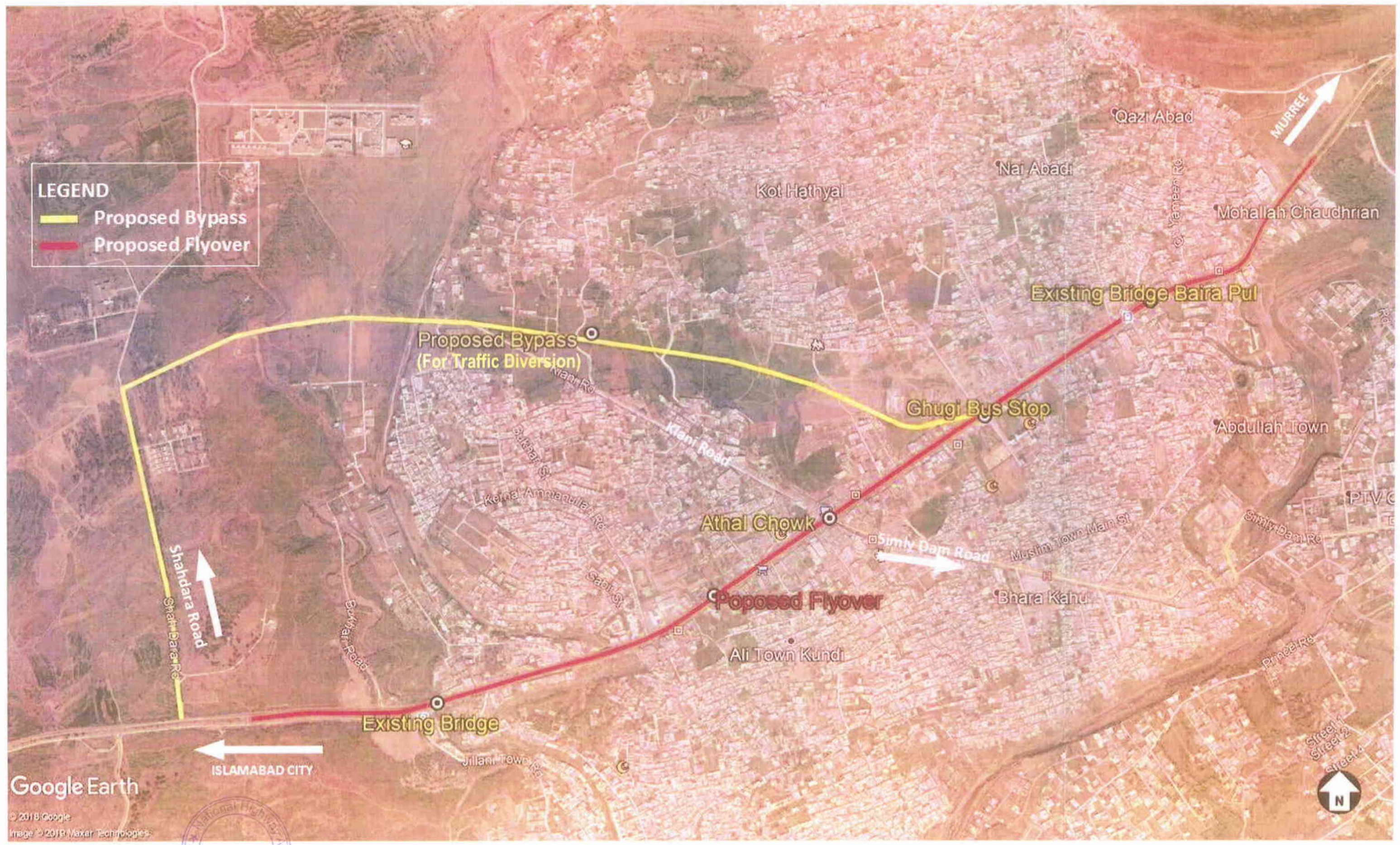
- (ii) Refer page-92, Sr. No. 01 of Professional/ Key Staff under the table Man Power Requirement, the Key/ Proposed Staff position i.e. Team Leader/ Senior Highway Engineer be replaced with Team Leader/ Senior Structural Engineer. The revised Man Power Requirement page-92 is attached at **Annexure-II to Addendum No. 01**.

2. All other terms and conditions shall remain same.

---ooOoo---



Barakahu Proposed Flyover



Google Earth

© 2018 Google
Image © 2018 Maxar Technologies



July 11, 2019

Developed By: Muneeb Muzammil (GIS/RS Specialist)
National Highway Authority (Design Section)

Feasibility Study and Detailed Design for Construction of 4-Lane Flyover at Bhara-Kahu (N-75) (3.5-KM)

MANPOWER REQUIREMENTS

Sr. No.	Key/ Proposed Staff Position	No. of Persons	Individual Man Months	Total Man Months
A. Professional/ Key Staff				
1	Team Leader/ Sr. Structural Engineer	1	4.00	4.00
2	Structural / Bridge Engineer	1	4.00	4.00
3	Highway Engineer	1	1.00	1.00
4	Hydraulic / Drainage Engineer	1	0.50	0.50
5	Electrical Engineer	1	1.00	1.00
6	Highway Safety Engineer	1	1.00	1.00
7	GIS Expert	1	0.50	0.50
			Sub-Total	12.00
B. Non Key/ Support Staff				
1	Quantity Surveyor	1	4.00	4.00
2	CAD Operators	2	3.00	6.00
3	Computer Operators	2	4.00	8.00
4	Helpers	2	4.00	8.00
5	Peons	2	4.00	8.00
			Sub-Total	34.00
			Total Man-Months	46.00



National Highway Authority



REQUEST FOR PROPOSAL

For

**Feasibility Study and Detailed Design
for Construction of 4-Lane Flyover at
Bhara-Kahu (N-75) (3.5-KM)**

Tender No. 6(492)

October, 2019

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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 (Person-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 associates' 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.

1.10 A firm may submit its proposal for the Assignment either as an independent Consultant or as a Member of a JV Consultants but participation of a firm occurring in more than one proposal for the Assignment is not allowed. In case a firm participates in more than one proposal, all such proposals shall be **disqualified and rejected**. However this condition does not apply for individual Specialist Sub-consultant(s).

2. DOCUMENTS

- 2.1 To prepare a proposal, please use the Documents specified in the Data Sheet.
- 2.2 Consultants requiring a clarification of the Documents must notify the Client, in writing, not later than twenty-one (21) days before the proposal submission date. Any request for clarification in writing, or by cable, telex or tele-fax shall be sent to the Client's address specified in the Data Sheet. The Client shall respond by cable, telex or tele-fax to such requests and copies of the response shall be sent to all invited Consultants.
- 2.3 At any time before the submission of proposals, the Client may, for any reason, whether at its own initiative or in response to a clarification requested by an invited consulting firm, modify the Documents by amendment. The amendment shall be sent in writing or by cable, telex or tele-fax to all invited consulting firms and will be binding on them. The Client may at its discretion extend the deadlines for the submission of proposals.

3. PREPARATION OF PROPOSAL

It will consist of two parts – Technical and Financial

3.1 Technical Proposal

- 3.1.1 The Technical Proposal should be submitted using the format specified and shall include duly signed and stamped forms appended with the RFP. This is a mandatory requirement for evaluation of proposals and needs to be filled up carefully.
- 3.1.2 For Technical Proposal, the general approach and methodology which you propose for carrying out the services covered in the TOR, including such detailed information as you deem relevant, together with your appreciation of the Project from provided details and
 - (a) A detailed overall work program to be provided with timing of the assignment of each expert or other staff member assigned to the project. This will also provide the Client an opportunity to effectively monitor work progress.



- (b) Total number of man-months and project duration as per TOR.
- (c) Clear description of the responsibilities of each expert staff member within the overall work program.
- (d) The Curriculum Vitae (CV) of all Key Staff members and an affidavit that proposed staff shall be available for the assignment during the project duration and their present place of duty may also be specified. The Consultants are advised to suggest such names that shall be available for the Assignment.
- (e) The technical proposal shall include duly filled in forms provided with this RFP. The name, background, and professional experience of each expert staff member to be assigned to the project, with particular reference to his experience of work of a nature similar to that of the proposed assignment.
- (f) Current commitments and past performance are the basic criteria of technical proposal. You are required to provide the details of present commitments/on- going jobs as referred in the Form A-10 of technical proposal. Further, the basis for the past performance is the report from Design Section and Construction Wing of the Client.

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

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

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



- c. Subcontracting part of the assignment to the other Consultants is not discouraged and Specialist Sub-Consultants may be included.
 - d. The key professional staff proposed shall be permanent employees of the firm unless otherwise specified in the Data Sheet. The minimum stay with the firm for such persons is Six months. No alternative to key professional staff may be proposed and only one CV may be submitted for each position. The minimum required experience of proposed Key Staff is specified in the Data Sheet.
 - e. The training shall be imparted during the currency of the contract if specified in the Data Sheet.
- 3.1.5 The technical proposal shall not include any financial information. The Consultant's comments, if any, on the data, services and facilities to be provided by the Client and specified in the TOR shall be included in the technical proposal.

3.2 Financial Proposal

- 3.2.1 The financial proposal should be submitted using the format specified and enclosed with this RFP. This is a mandatory requirement for evaluation of proposals and needs to be filled up carefully. The total cost is to be specified in the Form A-17 and accordingly also in Form A-11.
- 3.2.2 The financial proposal should list the costs associated with the Assignment. These normally cover remuneration for staff in the field and at headquarters, per diem, housing, transportation for mobilization and demobilization, services and equipment (vehicles, office equipment furniture and supplies), printing of documents, surveys and investigations. These costs should be broken into foreign (if applicable) and local costs. Your financial proposal should be prepared using the formats attached as forms A-11 to A-17.
- 3.2.3 The financial proposal shall also take into account the professional liability as provided under the relevant PEC Byelaws 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.

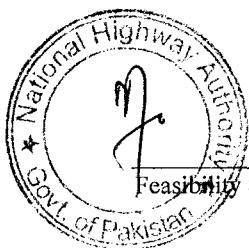


4. SUBMISSION OF PROPOSALS

- 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. 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 (F_m) among all shall be given a financial score: S_f 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 (S_t) and financial (S_f) scores using the weights (T - the weight given to the technical proposal, P = the weight given to the financial proposal, and $T+P=1$) stated in the Data Sheet:

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

6. NEGOTIATION

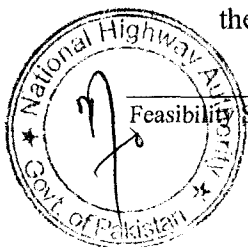
6.1 Prior to the expiration of proposal validity, the Client shall notify the successful Consultant who submitted the highest-ranking proposal in writing, by registered letter, cable telex or facsimile and invite it to negotiate the Contract.

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.

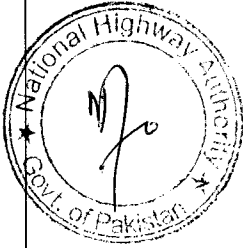


DATA SHEET

LOI Clause No.	DESCRIPTION OF CLAUSE
1.1	<p>The name of Assignment is: - “Feasibility Study and Detailed Design For Construction Of 4-Lane Flyover at Bhara-Kahu N-75 (3.5KM)”</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(s) and address(es) of the Official(s) is (are):</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: 10th October 2019 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,</p>

	<p>anything written elsewhere on this account including financial implications, if any, shall be considered of no consequence in the evaluation process.</p> <p>v. Consultants may form a Joint Venture (JV) to qualify for the Assignment in which case the contract will be signed between the Client and all members of the JV on the prescribed Form included in Appendix E (copy of Model Agreement) subject to the ranking and successful negotiations. A JV may include at the most four members. To promote the consultancy industry in the country, 50 marks (out of 1000 for Evaluation) are allocated for Transfer of Knowledge in the form of JV with a new / less experienced firm by sharing at least 20% of Assignment with them.</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 with relevant Project Profile Codes. Foreign consulting firms shall make JV in accordance with Byelaw 6(2) and Byelaw 9 of the Pakistan Engineering Council (Conduct and Practice of Consulting Engineers) Bye-Laws 1986. Failure to provide valid Registration Certificate (license) of the firm (each member in case of JV) by the PEC will entitle the Client to reject the proposal.</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 last three relevant assignments from the respective Clients. Moreover, any adverse report regarding performance of Consultant on NHA projects received from NHA's any relevant quarter may become basis for its disqualification from the services above named in clause 1.1.</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 opening.</p>		
3.1.4	<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 Personnel is given below:</p> <p style="text-align: center;">FOR KEY PERSONNEL</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 30%; vertical-align: top;"> <p>Team Leader / Sr. Structural Engineer</p>  </td> <td style="vertical-align: top;"> <p>Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years’ relevant experience [proven fifteen (15) years’ design experience as Senior Structure/ Bridge Engineer on National Highways Projects];</p> <p>-OR-</p> <p>M.Sc. (Structural Engineering) with minimum eighteen (18) years relevant experience [proven thirteen (13) years’ design experience as Senior Structure/ Bridge Engineer on National Highways Projects];</p> <p>He/she must also have performed as Team Leader for at least three (03) major Highway/Bridge Design Projects</p> </td> </tr> </table>	<p>Team Leader / Sr. Structural Engineer</p> 	<p>Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years’ relevant experience [proven fifteen (15) years’ design experience as Senior Structure/ Bridge Engineer on National Highways Projects];</p> <p>-OR-</p> <p>M.Sc. (Structural Engineering) with minimum eighteen (18) years relevant experience [proven thirteen (13) years’ design experience as Senior Structure/ Bridge Engineer on National Highways Projects];</p> <p>He/she must also have performed as Team Leader for at least three (03) major Highway/Bridge Design Projects</p>
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Structural / Bridge Engineer	<p>Minimum B.Sc. (Civil Engineering) with minimum Fifteen (15) years' relevant experience (proven Thirteen (13) years' design experience as Senior Structure/ Bridge Engineer on National Highways Projects);</p> <p>-OR-</p> <p>M.Sc. (Structural Engineering) with minimum Twelve (12) years relevant experience [proven Ten (10) years' design experience as Senior Structure/ Bridge Engineer on National Highways Projects];</p>
Highway Engineer	<p>Minimum B.Sc. (Civil Engineering) with minimum Fifteen (15) years relevant experience [proven Thirteen (13) years' design experience as on major Highway Projects];</p> <p>-OR-</p> <p>M.Sc. (Transportation Engineering) with minimum Twelve (12) years relevant experience [proven Ten (10) years' design experience as on major Highway Projects];</p>
Hydraulic \Drainage Engineer	<p>Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years relevant experience (proven eighteen (18) years' design experience as Hydrology & Drainage Engineer on major Highway and Bridge Projects);</p> <p>-OR-</p> <p>M.Sc. (Hydrology/ Drainage/ Hydraulic Engineering) with minimum eighteen (18) years relevant experience (proven sixteen (16) years' design experience as Hydrology & Drainage Engineer on major Highway and Bridge Projects);</p>
	<p>Minimum B.Sc. (Electrical Engineering) with minimum ten (10) years relevant experience proven Eight (08) years' experience as Electrical Engineer on major Highway Projects);</p> <p>-OR-</p> <p>M.Sc. (Electrical Engineering) with minimum Eight (08) years relevant experience (proven Five (05) years' experience as Electrical Engineer on major Highway Projects);</p>
Highway Safety Engineer	<p>Minimum B.Sc. (Civil Engineering) with minimum twenty (20) years' relevant experience (proven eighteen (18) years' experience as Safety Engineer on</p>

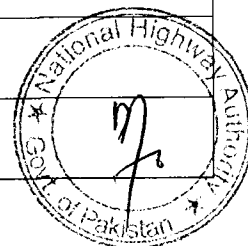
	major Highway Projects); -OR- M.Sc. (Civil Engineering/ Traffic Engineering/ Transportation Engineering) with minimum eighteen (18) years relevant experience (proven sixteen (16) years' experience as Safety Engineer on major Highway Projects); He/she must also have experience of independently leading Highway Safety Audit Team for at least one major Highway Project;
GIS Expert	Minimum M.Sc. (GIS) with minimum fifteen (15) years relevant experience [proven thirteen (13) years' experience as GIS Expert in Design of Highway and Bridges 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	
3.2.3	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: 29th October 2019 Time: 1130 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</p> <p>The bid shall remain valid up to 25th April 2020</p> <p>The location for negotiation of 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>																																						
5.2	<p>The evaluation of technical proposal shall be based on following criteria:</p> <table border="0"> <thead> <tr> <th style="text-align: left;">Description / Items</th> <th style="text-align: right;">Points</th> </tr> </thead> <tbody> <tr> <td>1. Experience of the Firm</td> <td style="text-align: right;">100</td> </tr> <tr> <td>1-a) General Experience in road Transport Sector</td> <td style="text-align: right;"><u>(25)</u></td> </tr> <tr> <td>1-b) Specific Experience related to particular Assignment</td> <td style="text-align: right;"><u>(75)</u></td> </tr> <tr> <td>2. Approach & Methodology</td> <td style="text-align: right;">250</td> </tr> <tr> <td>2-a) Appreciation of the Project</td> <td style="text-align: right;"><u>(70)</u></td> </tr> <tr> <td>(i). Evidence of Site Visit with Photographs</td> <td style="text-align: right;"><u>(30)</u></td> </tr> <tr> <td>(ii). Clarity of appreciation</td> <td style="text-align: right;"><u>(20)</u></td> </tr> <tr> <td>(iii). Comprehensiveness of appreciation</td> <td style="text-align: right;"><u>(20)</u></td> </tr> <tr> <td>2-b) Problem Statement/ Understanding of Objectives</td> <td style="text-align: right;"><u>(50)</u></td> </tr> <tr> <td>(i). Identification of Problems/ Objectives</td> <td style="text-align: right;"><u>(30)</u></td> </tr> <tr> <td>(ii). Components of Proposed Services</td> <td style="text-align: right;"><u>(20)</u></td> </tr> <tr> <td>2-c) Methodology</td> <td style="text-align: right;"><u>(80)</u></td> </tr> <tr> <td>(i). Proposed Solutions for this Project</td> <td style="text-align: right;"><u>(30)</u></td> </tr> <tr> <td>(ii). Quality of Methodology</td> <td style="text-align: right;"><u>(20)</u></td> </tr> <tr> <td>(iii). Conciseness, clarity and completeness of proposal</td> <td style="text-align: right;"><u>(30)</u></td> </tr> <tr> <td>2-d) Suggested changes for improvement in TOR</td> <td style="text-align: right;"><u>(10)</u></td> </tr> <tr> <td>2-e) Work Program</td> <td style="text-align: right;"><u>(20)</u></td> </tr> <tr> <td>2-f) Staffing Schedule</td> <td style="text-align: right;"><u>(20)</u></td> </tr> </tbody> </table>	Description / Items	Points	1. Experience of the Firm	100	1-a) General Experience in road Transport Sector	<u>(25)</u>	1-b) Specific Experience related to particular Assignment	<u>(75)</u>	2. Approach & Methodology	250	2-a) Appreciation of the Project	<u>(70)</u>	(i). Evidence of Site Visit with Photographs	<u>(30)</u>	(ii). Clarity of appreciation	<u>(20)</u>	(iii). Comprehensiveness of appreciation	<u>(20)</u>	2-b) Problem Statement/ Understanding of Objectives	<u>(50)</u>	(i). Identification of Problems/ Objectives	<u>(30)</u>	(ii). Components of Proposed Services	<u>(20)</u>	2-c) Methodology	<u>(80)</u>	(i). Proposed Solutions for this Project	<u>(30)</u>	(ii). Quality of Methodology	<u>(20)</u>	(iii). Conciseness, clarity and completeness of proposal	<u>(30)</u>	2-d) Suggested changes for improvement in TOR	<u>(10)</u>	2-e) Work Program	<u>(20)</u>	2-f) Staffing Schedule	<u>(20)</u>
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	<p>3. Key Staff 450</p> <p>4. Performance Certification from clients 100</p> <p>5. Present Commitments (current engagement and available strength – justification) 50</p> <p>6. Transfer of Knowledge*(Methodology/ Plans) 50</p> <p style="text-align: right;">Total Points: 1000</p>										
	<p>Minimum qualifying technical score: 700</p> <p>* Transfer of knowledge would be in the form of joint venture with new/ less experienced firm(s) by sharing at least 20% of Assignment with them for promoting the consultancy industry in the country.</p> <p>The points earmarked for evaluation sub-criteria (3) for suitability of Key Staff are: -</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 70%;"></th> <th style="width: 30%; text-align: right;">Points (%)</th> </tr> </thead> <tbody> <tr> <td>i. Academic and General Qualifications</td> <td style="text-align: right;">30</td> </tr> <tr> <td>ii. Professional experience related to the Project</td> <td style="text-align: right;">60</td> </tr> <tr> <td>iii. Status with the firm (Permanent & duration with Firm as per LOI Clause 3.1.4 (d))</td> <td style="text-align: right;">10</td> </tr> <tr> <td style="text-align: right;">Total Points:</td> <td style="text-align: right;">100</td> </tr> </tbody> </table>		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> <table style="width: 100%;"> <tr> <td>Technical:</td> <td style="text-align: right;">80%</td> </tr> <tr> <td>Financial:</td> <td style="text-align: right;">20%</td> </tr> </table>	Technical:	80%	Financial:	20%						
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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 basis.</p>										
7.2	The assignment is expected to commence in: January 2020										
8	The Clause is deleted in its entirety										



Checklist for Completeness of Proposal

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



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

Certification:-

I, the undersigned, certify to the best of my knowledge and belief that all above mentioned documents (as applicable), Sr. No.1 to 13 have been attached to our proposal and signed and stamped as per requirement mentioned at Sr. No.14. 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 & initials 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, otherwise the client may have a right to reject the proposal.

SUMMARY EVALUATION SHEET FOR FULL TECHNICAL PROPOSALS (QCBS)

EVALUATION CRITERIA	Max. Weight	Firm 1		Firm 2	
		Rating	Score	Rating	Score
1. Firms Experience	100				
General Experience in road Transport Sector	25				
Specific Experience related to particular Assignment	75				
2. Approach and Methodology	250				
2-a. <i>Appreciation of the Project</i>	70				
(i) Evidence of Site Visit with Photographs	(30)				
(ii) Clarity of appreciation	(20)				
(iii) Comprehensiveness of appreciation	(20)				
2-b. Quality of Methodology	50				
(i) Identification of Problems/ Objectives	(30)				
(ii) Components of Proposed Services	(20)				
2-c. Methodology	80				
(i) Proposed Solutions for this Project	(30)				
(ii) Quality of Methodology	(20)				
(iii) Conciseness, clarity and completeness of proposal	(30)				
2-d. Suggested Changes for Improvement in TOR	10				
2-e. Work Program	20				
2-f. Staffing Schedule	20				
3. Key Personnel	450				
Team Leader / Sr. Structural Engineer	180				
Structural / Bridge Engineer	140				
Highway Engineer	40				
Hydraulic / Drainage Engineer	20				
Electrical Engineer	20				
Highway Safety Engineer	40				
GIS Expert	10				
4. Performance Certification from clients	100				
5. Present Commitments (current engagement and available strength – justification)	50				
6. Transfer of Knowledge (Methodology/ Plans)	50				
TOTAL:	1000				

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

Score: Maximum Weight x rating / 100.

Minimum qualifying score is 70% or 700 marks.



a) 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)								
b) Team Leader / Sr. Structural Engineer								
c) Structural / Bridge Engineer								
d) Highway Engineer								
e) Hydraulic / Drainage Engineer								
f) Electrical Engineer								
g) Highway Safety Engineer								
h) GIS Expert								

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 / Sr. Structural Engineer, Structural / Bridge Engineer, Highway Engineer, Hydraulic / Drainage Engineer, Electrical Engineer, Highway Safety Engineer, GIS Expert: M.Sc. with additional trainings/courses relevant to assignment -100%; M.Sc. - 90%; B.Sc. with additional trainings/ courses relevant to assignment - 80%; B.Sc. - 70%

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



TECHNICAL PROPOSAL FORMS



Technical Proposal – Forms

{Notes to Consultant shown in brackets throughout this Section provide guidance to the Consultant to prepare the Technical Proposal; they should not appear on the Proposals to be submitted.}

Checklist of Required Forms (subparagraph 3.1.3 of ITC)

Required, (√)	FORM	DESCRIPTION	Page Limit
√	A-1	Technical Proposal Submission Form	
√	A-1 Attachment	Proof of legal status and eligibility	
“√” If applicable	A-1 Attachment	If the Proposal is submitted by a joint venture, attach a letter of intent or a copy of an existing agreement.	
“√” If applicable	A-1 Attachment Power of Attorney	No pre-set format/form. In the case of a Joint Venture, several are required: a power of attorney for the authorized representative of each JV member and a Special power of attorney for the representative of the lead member to represent all JV members.	
√	A-2	Consultant’s Organization and Experience.	As given below
√	A-2A	A. Consultant’s Organization	3
√	A-2B	B. Consultant’s Experience/ Client’s Reference	20
√	A-3	Approach Paper on Methodology proposed for Performing the Assignment	50
√	A-4	Comments/ Suggestions of Consultant	[See footnote] ¹
√	A-4A	A. On the Terms of Reference	n/a
√	A-4B	B. On the Counterpart Staff and Facilities	2
√	A-5	Format of Curriculum Vitae (CV) for proposed Key Personnel	8 pages each CV
√	A-6	Completion and Submission of Reports as per TOR	n/a
√	A-7	Composition of the Team Personnel and the Tasks to be Assigned to each Team Member	n/a
√	A-8	Work Plan /Activity Schedule	n/a
√	A-9	Work Plan and Time Schedule for Key Personnel	n/a
√	A-10	Current Commitments of the Firm	n/a

Note: Failure to provide required attachments with Form A-1 will entitle the Client to reject the proposal

¹ The total number of pages for combined forms A-3 and A-4 should not exceed 50. A page is defined as one printed side of A4 or letter-size paper with font size of 10 or more.

TECHNICAL PROPOSAL SUBMISSION FORM

{Location, Date}

To: [Name and address of Client]

Dear Sirs:

We, the undersigned, offer to provide the **Feasibility Study and Detailed Design for Construction of 4-Lane Flyover at Bhara-Kahu (N-75) (3.5KM)**. 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.

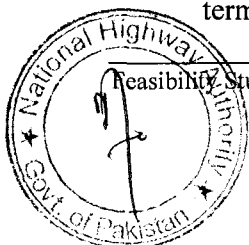
{If the Consultant is a joint venture, insert the following: We are submitting our Proposal in a joint venture with: {Insert a list with full name and the legal address of each member, and indicate the lead member}. We have attached a copy {insert: "of our letter of intent to form a joint venture" or, 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.
- (h). our firm/ each member of our JV is not participating in any other proposal for this Assignment.

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/relevant council is Mandatory. Copy of online updated PEC/relevant council details, as per Membership Number shall be attached)
11. Detailed Tasks Assigned on the Project: _____

◆ Key Qualifications:

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

◆ Education

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

◆ Employment Record

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



◆ Languages

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

◆ Certification

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

- (i) This CV correctly describes my qualifications and experience.
- (ii) I am not a current employee of the Executing or the Implementing Agency.
- (iii) In the absence of medical incapacity, I will undertake this assignment for the duration and in terms of the inputs specified for me in Form A-9 provided team mobilization takes place within the validity of this proposal.
- (iv) I was not part of the team who wrote the terms of reference for this consulting services assignment
- (v) I am not currently debarred by any department/organization/ (semi-autonomous/ autonomous) bodies or such like institutions in Pakistan.
- (vi) I certify that I have been informed by the firm that it is including my CV in the Proposal for the {name of project and contract}. I confirm that I will be available to carry out the assignment for which my CV has been submitted in accordance with the implementation arrangements and schedule set out in the Proposal.

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

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

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

Signature of expert or authorized representative of the firm

Date: _____
Day/Month/Year



Full name of authorized representative: _____

Note: copy or scanned signatures are not allowed

COMPLETION AND SUBMISSION OF REPORTS AS PER TOR

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



30

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

1. Technical/Managerial Staff

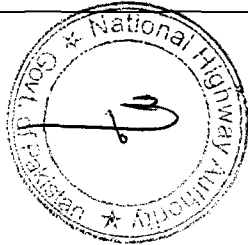
NAME	POSITION	Tasks Assignment	Present location	Name of assignment involved and clients name



31

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



32

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 _____

33

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

34



FINANCIAL PROPOSAL FORMS



FINANCIAL PROPOSAL SUBMISSION FORM

{Location, Date}

To: [Name and address of Client]

Dear Sirs:

We, the undersigned, offer to provide **Feasibility Study and Detailed Design for Construction of 4-Lane Flyover at Bhara-Kahu (N-75) (3.5KM)**. In accordance with your Request for Proposal dated [Insert Date] and our Technical Proposal.

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

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

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

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

We remain,

Yours sincerely,

Authorized Signature {In full and initials}: _____

Name and Title of Signatory: _____

In the capacity of: _____

Address: _____

E-mail: _____

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



Form A-12

BREAKDOWN OF RATES FOR CONSULTANCY CONTRACT

Project: _____ Consultant: _____

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

Notes:

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

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

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

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

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

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

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



Full Name: _____

Signature: _____

Title: _____

ESTIMATED LOCAL CURRENCY SALARY COSTS/REMUNERATION

Sr. No.	Position	No. of persons	Individual man months	Monthly Billing Rate	Total Estimated Amount (Rs.)
I. Professional / Key Staff					
Sub-Total:					



Form A-15
Page 2 of 2

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:				

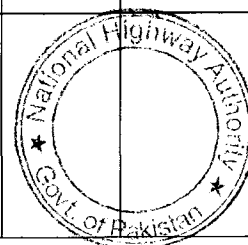
Note: The bidders are required to quote the rates of Non Key/Support Staff given in the TOR in above table. The bidder(s) may propose Non Key/ Support Staff Person-Months in addition to those given in TOR; however, in such a case tenable reasons must be given in the Technical Proposal Submission Form 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.



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. Photocopy machines (Rentals) iii. Communication equipment iv. Drafting / Engineering equipment v. Transport Vehicles (Rentals) vi. Site visits and Meetings in Islamabad during currency of Project and construction works	L.S			
5.	Communication expenses	Per Month	4		
6.	Drafting/ Reproduction of Reports	L.S			
7.	Office/ Drafting Supplies	L.S			
8.	Topographic Survey for Monumentation, GCPs, Inventory of Structures and others reference points, stakeout of Alignment including report and drawing production, instrument rental charges, surveyor(s) & survey helper salary etc. (Complete in all respects)	L.S			
9.	Geotechnical Investigation for Bridges (Boreholes of 30 m Depth)including instrument rental, salary of Geo-Technical Engineer, Helpers, report Writing , etc. (complete in all respects)	P.S			4,000,000
10.	Environmental Impact Assessment Including Report writing, NOC Fee, Environmental Engineer Salary Coordination with Pak EPA & Public Hearing Charges (Complete in all Respects.	L.S			



Sr. No.	Nomenclature	Unit	Qty.	Unit Price (Rs.)	Total Amount (Rs.)
11.	Traffic Survey Including Report writing & Salary of traffic Engineer and Enumerators (complete in all respects)	L.S			
12*.	Others not covered above to comply with TOR requirement ²	L.S			
Total					

NOTE:

* Any additional item\ cost quoted against this line item must have provided solid\tenable justification(s) detailed in technical proposal submission Form A-4 "Comments on TOR" without indicating financial value therein. The client's negotiation committee will deliberate on the requirement of additional item\ cost in case such firm stands top ranked. It is also to be noted by the consultants that the clients are not bound to agree to the reasons given in Form A-4.



SUMMARY OF COST

Sr. No.	Description	Amount (Rs.)
1.	Salary Cost/Remuneration	
2.	Direct (Non-Salary) Cost	
3.	Sub Total (1+2):	
4.	Sales Tax @ 16% on item S.No.3 above which shall be kept as Provisional Sum in the Contract Agreement	Not Applicable till final decision of the Court of Law ⁽⁴⁾
5.	Grand Total:	

- Note:
- 1- This cost is supposed to be built up in bid price and if anything is left blank it shall be deemed to be included in the cost.
 - 2- The dues and salaries of staff are payable by the consultant in time and not later than 10th of the following month positively. In case of failure to do so Client shall intervene and pay these dues and salaries of the concerned Personnel and recover from the invoice of the consultant at actual charges paid plus 1% of the amount. This will also be accounted for adversely in making assessment of the Consultants in the next evaluation process for selection of consultants with report of such defaults.
 - 3- Any Omission or arithmetical error made by the Consultants in entering the amount against item 4 above shall also be rectified during evaluation of the Financial Proposal.
 - 4- Relevant documents are attached at the end of RFP.
 - 5- 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.



APPENDIX-A

TERMS OF REFERENCE

(TOR)



CHAPTER NO. 01

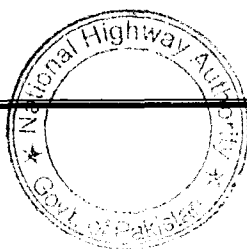
INTRODUCTION

1.1 Background:

National Highway Islamabad - Satra Mile-Lower Topa Kohala (N-75) is a strategic road. Its length upto Kohala is about 90km. It connects Azad, Jammu & Kashmir (AJ&K) with Pakistan at Kohala further it moves towards Muzaffarabad which is capital of Azad Jammu & Kashmir. NHA has upgraded it up to Lower Topa. Murree is famous city for tourism which is located on offset of this N-75 alignment at Km 55 (approx) which attracts tourists in summer and winter seasons. Therefore, traffic volume on this road considerably increases during these seasons and especially on holidays. A great no. of times traffic blockage has been observed on this road due to high traffic volume. BharaKahu city is a well-populated and congested point on N-75 which is located at only 8.6 Kms from Islamabad. The BharaKahu is a bottle neck for smooth traffic flow. There is a built-up area having big shopping malls on both sides of this road at BharaKahu. Therefore, widening of National Highway at BharaKahu seems more costly and there will be a problem for resettlement due to commercial area. Therefore, to resolve the traffic congestions problems appropriately and to ensure smooth traffic flow on N-75 and safety of people crossing the road and to avoid frequent accidents at this location, NHA intends to conduct a feasibility study for 04-lane flyover/overhead Bridge at BharaKahu on N-75 and if found economic viable then detailed design will be carried out along with. Therefore, for said assignment, appointment of consultant is desired.

1.2 Need Assessment:

BharaKahu city is a well-populated and congested area on N-75 which is located only 8.6km from Islamabad. The BharaKahu is a bottle neck for smooth traffic flow along National Highway N-75 because there is also built-up area having big shopping malls on both sides of this road at BharaKahu. Therefore, widening of National Highway at BharaKahu will involve heavy financing along with there will be an issue of resettlement being commercial area along N-75. Therefore, to resolve the traffic congestions problems appropriately and to ensure smooth traffic flow on N-75 & safety of people



crossing the road and to avoid frequent accidents at this location, NHA intends to conduct a feasibility study for 04-lane flyover/overhead Bridge at BharaKahu on N-75 and if found economically viable then detailed design will be carried out. This TOR has been prepared for appointment of consultant for carrying out feasibility study and detailed design for provision of underpass/flyover at BharaKahu.

1.3 Project Definition/location:

The proposed site for construction of 04-lane of flyover located at BharaKahu on National Highway N-75 (Islamabad - Satra Mile - Lower Topa - Kohala) which is 8.6 Kms from Zero Point of N-75. BharaKahu city is part of Islamabad Capital Territory.

The Project envisages construction of 04-lane flyover at BharaKahu N-75. The length of bridge is about 3.5-kms (approx). The proposed site for said flyover is located on N-75 having high traffic volume. Therefore, type of bridge will be proposed/ worked out by the Design Consultant keeping in view, traffic volume, commercial areas/malls along both sides of road and to maintain uninterrupted traffic flow during construction. The proposal whether it is a T-Shape girder bridge or having box girder will be presented to NHA within 15 days after signing the agreement alongwith merits and demerits for both types of bridges/flyovers (or any other option) and with consent of NHA. The proposal and type of bridge/flyover will be finalized and the design consultant will process accordingly.

➤ Traffic Plan:

The consultant will also work out a traffic plan for construction period of said flyover along with safety measures. The Consultant will study Traffic enforcement and bypass option and will come out with his views. The Consultant will carry out proper traffic study and should suggest 04-lane or 06-lane accordingly.



MS

➤ **Technical Parameters:**

• Length (Tentative)	3.5 Kms (including approaches)
• Start Point	At Km 6+500 (Jillani Town)
• End Point	At Km 10-000
• Existing road Barrier	4.0 Lanes with New Jersey
• Built up area (Densely Populated)	2.5 Km length on both sides
• Link Roads	a. Kernal Ammanullah Road b. Simly Dam Road c. Kyani Road
• ROW Status	
a. Carriageway North Bound	= 7.5 m
b. Open space from edge of road upto building line (Left Side)	= 10.0 m
c. New Jersey Barrier	= 0.5 m
d. Carriageway South Bound	= 7.5 m
e. <u>Open space on right side</u>	= 1.5 m
Total	27 m

1.4 Project Objectives:

- To keep traffic flow smooth and uninterrupted from Islamabad to Murree and vice versa thus promoting tourism.
- To remove all the existing congestion of the BarahKahu road.
- To reduce Travel time.
- To rehabilitate the existing road as realignment of the center line is required.
- Job Opportunities for local people would be created.
- Safe movement of pedestrian across the road would be possible.



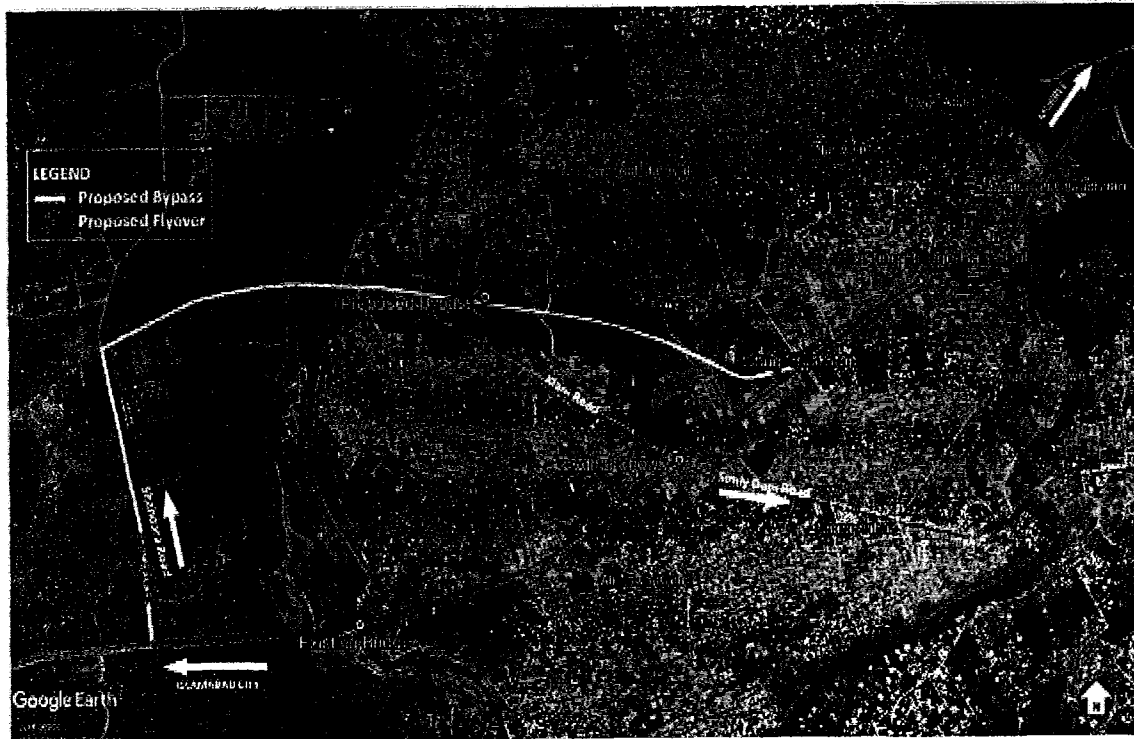
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CHAPTER NO. 02

DESCRIPTION OF PROJECT

2.1 Location of Project:

The proposed site for construction of 04-lane of flyover located at BharaKahu on National Highway N-75 (Islamabad-Satra Mile – LowerTopa-Kohala) which is 8.6 Kms from Zero Point of N-75. BharaKahu city is part of Islamabad Capital Territory. (Location map is attached below)



2.2 Project Works

- Detailed Topographic Survey with establishment of survey control points.
- Traffic Diversion Plan
- Evaluation of existing pavement
- Evaluation of existing structures (bridges, culverts, retaining walls, side drains, causeways, etc.) with recommendations for retention / improvement / new construction.
- Geometric Improvement of existing road with realignment of centreline of existing road.
- Traffic & Axle Load Survey
- Soil & Material Investigations



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- Geo-Technical Investigations for flyover
- Construction Machinery & Material Survey with identification of Quarry Sites
- Pavement Design along with Surface Drainage Analysis
- Road furniture design including traffic signs and gantries
- Highway Safety Audit & Provision of Highway Safety Measures
- Ground Validation
- Land Acquisition & UtilityFolders **(if required)**
- Tender Drawing, Documents, C-Factor, Cost Estimates & BOQ
- Environmental Impact Assessment (EIA)
- Economic Analysis/Benefits with Traffic Study
- Preparation of PC-I

2.3 Time of Start:

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

2.4 Time Period

The service specified in the TOR shall be completed in all respect 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 or Letter of Commencement.



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Major Contents

- Background
- Project Objectives
- Scope of Services and Expected Deliverables
- Team Composition and Qualification Requirement of Key Personnel and Specialist Sub-consultant.



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CHAPTER NO. 3

TOR / SCOPE OF SERVICES FOR DETAILED DESIGN

3.1. GENERAL

NHA intends to appoint an experienced, reputable and qualified consultant for carrying out Feasibility Study & Detailed Design for Construction of 4-Lane Flyover on N-75 at Bhara Kahu. The Consultant shall subsequently issue the Construction Drawings and assume complete onus and responsibility leading up to commissioning of project. The location map of the proposed road is shown in Chapter 2 of this document. The approximate length of the proposed Flyover is 4.0 Km.

The scope of work defined herein is expected to be carried out by the consultant to complete the detailed design and formulation of Tender & Construction drawings and consequently assume complete onus and responsibility.

Consultant is required to go through the defined scope of work given herein. Any shortcoming / deficiency is required to be spelled out in the pre-bid meeting and recorded in the comments to TOR. After the signing of the contract, any further requirement is assumed to be included in the quoted bid price and will not be entertained later, unless further requirement is instructed by the client or otherwise may become necessary to economize the Construction Cost and improve the facilities for convenience of operation.

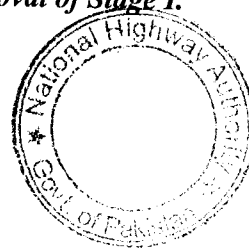
3.2. SCOPE OF WORK

Consultant is required to carry out following activities within the stipulated time for the contract:

Stage-I

- Comment on Terms of Reference and query about them at pre-proposal meeting
- Data Collection/Co-ordination with concerned Departments
- Desk study and Reconnaissance visit.
- Alignment options worked out in accordance with the Geometric Standards set forth in the TOR
- Traffic survey and Axle load survey or collection of data from nearby weigh stations
- Satellite images of entire corridor with alignment duly marked on it.
- Presentation of alignment alternatives along with recommended alignment for approval from NHA

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



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Stage-II

- Topographic survey with establishment of survey control points
- Soil investigation
- Evaluation of existing pavement strength, if any
- Identification of quarry sites and construction material survey
- Geotechnical Investigation survey for Structures.
- Road furniture design including traffic signs and gantries
- Hydrology & Hydraulic design of alignment & structures including flash flood routing
- Evaluation of existing structures (bridges, culverts, retaining walls, side drains, causeways, etc.) with recommendations for retention / improvement / new construction.
- Structures Design
- Geometric Design
- Provision of ducts/crossing of future utilities like OFC, pipelines etc
- Pavement Design with surface runoff calculations
- Highway Safety Audit
- Horticulture and Landscaping of intersections, if any

Stage-III

- Tender Documents including Drawings, C-Factor, BOQ, Engineer's Estimate, Particular Specifications and Special Provisions
- Utility folders and Land Acquisition Plans including complete details of land owners as per Shajra Parcha as per Provincial Department Record (if required).
- Stakeout of design alignment after approval for ground validation
- Fixation of ROW markers when required by the Client
- Preparation / revisions of PC-1 along with Economic Analysis

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 / 3rd party review consultant. Any comments offered by the Client do not absolve the consultant from its obligation to develop correct and cost-effective engineering solutions for the Project. It is solely the discretion of the Consultant to either incorporate them or reject them all together. Only one round of review comments will be entertained. If the issue(s) still remain unsolved, then a meeting of Design Consultant with the Client may be arranged for timely address of the issue(s). Hence, all sort of unnecessary correspondences must be avoided. NHA reserves



the right to take punitive actions as required at appropriate forum even during construction stage.

The consultant is also required to deploy a qualified co-ordination engineer for one month at the Project site. He will have an experience of at least 15 years in the relevant field. In case of any design ambiguities, he will liaison with the Design engineer for correcting deficiencies. His boarding and lodging shall be the responsibility of the Design Consultant. It is obligation of the Design Consultant to provide complete support to the Construction team even if he does not have the supervision.

The following points must be given due consideration by Consultant:

- **Consultant is responsible for coordination with all concerned stakeholders. In case of any discrepancy or design change, arising out at any stage of the project due to lack of coordination with the relevant departments, the Consultant shall be held liable for such a change. In such a case, the Consultant shall not only modify the design but will be subjected to penalty equivalent to 5% of the Total Contract Amount (excluding taxes).**
- If the consultant wants to outsource any part of the scope of work, it will be mandatory to take prior approval of the Client.
- Consultant should strictly adhere to the workplan submitted in the Proposal or submitted during the Kickoff Meeting
- Client will not accept any submission unless and until the pre-requisites for that submission are submitted.
- If the consultant fails to submit a deliverable, a penalty equivalent to twice the amount / percentage of the task shall be imposed on the Consultant. In addition, an incompetence certificate shall be issued to the Consultant.
- The Consultant is required to submit Geo-Tagged Photographs along with date and time stamps for each survey and investigation location such as Bench Marks, Survey Monuments, Traffic & Axle Load Survey Locations, Soil, Material & Geotechnical Investigation Locations, etc.
- The Consultant is required to submit original Field books of Topographic Survey, Traffic and Axle Load Survey Forms & Testing Reports of Soil, Material and Geo-Technical Investigations. Same shall be stamped and signed by the concerned Engineer of the Consultant.

3.3. DESIGN STANDARDS



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The project will be four lane carriageway. Following design standards and Codes shall be followed:

Carriageway Width	3.65 m per lane
Shoulder Width	Inner 1.0 ~ 2.0 m paved Outer 2.0 ~ 3.0 m paved
Cross fall normal	Carriageway 2% Shoulder 4%
Maximum grade	3 %
Minimum grade	0.3 % in fill and 0.5 % in cut
Max. Super-elevation	6 %
Median	New Jersey Barrier
Geometric Design Standards	"A Policy on Geometric Design of Highway & Streets, Latest Edition"
Classification of Highway	Urban Highway
Design Speed	70 - 80Kph
Design Vehicle	6- Axle Trailer(1.22+222)
Minimum Turning Radius	30 m
Drainage	Curb, Gutter and Chutes for controlled drainage
Protection Works	Retaining Walls / Breast Walls, Toe Walls, Parapet Walls, etc.(where and if required)

Above standards are derived from "A Policy on Geometric Design of Highway & Streets, 2011". Any Design element not mentioned above should conform to the same design guide for Rural Arterial standard.

3.3.1. Standards for Structures

Following codes, standards and loads will be adopted for analysis and design of structures:

- **AASHTO-(LRFD) (Latest Edition): -**
For analysis and design for all loads and load combinations.
- **Pakistan Highway Code of Practice for Bridges 1967: -**
For vehicular loads, their spacing & impact factors.
- **UBC/IBC 2003: -**
For seismic zoning in addition to the revised 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. Modifying factors to be applied in consultation with Client to cater for overloading.
 - **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. Modifying factors to be applied in consultation with Client to cater for overloading.
 - **Check Deck Slab for Punching Shear:**
Additionally, the bridge deck slab shall be checked in Punching Shear for a Wheel Load of 21,000 Pounds [95 KN] on 0.25 x 0.5m² tire contact area.
- **Other Loads**
 - **Side-walk Live Load**
A load of 5 KN/m²(100 psf) of walkway between side barrier/railing and shoulder, applied continuously or discontinuously over both lengths and width of structure in order to produce maximum stresses in the member under consideration.
 - **Horizontal Live Load on Railing / Posts of Side Barrier**
These depend upon the configuration of the railing/posts/ barrier system. The position and the magnitude of the horizontal loads are taken according to Article 2.7 of AASHTO.
 - **Impact Load**
Impact loading on the bridge superstructure is taken in accordance with WPCHB.
 - **Wind Loads**
Wind loads are taken in accordance with the provision of WPCHB.
 - **Seismic Design**
International Building Code (IBC-2003) and Earthquake forces are calculated according to article 3.21 of AASHTO, keeping in view the recent earthquake of October 8, 2005, the earth quake zones will be considered accordingly.

3.3.2. Existing Structures

Consultants shall carry out detailed inspection of existing structures and based on condition of the structure shall recommend retention of existing structures or replacement. Where existing structures can be retained, design for widening/ extension of existing structures shall be carried out to commensurate with NHA standards for cross-section of



the road and structures. Condition Survey along with two photographs of each existing structure will be submitted in Evaluation of Existing Structures & Pavement Report. The Consultant will present detailed condition survey of existing pavement and structures before NHA for getting prior go-ahead for Detailed Design.

Structural Analysis

Structural Analysis shall preferably be performed using standard international software. All input files shall be provided in the Structure Design Report.

3.3.3. Roadside Design Standards

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

Task 1:	Data Collection & Coordination with Departments
Outcome:	Consultant get hold of relevant information, SOP Maps, Satellite imageries and liaison with local department/police

3.4. DATA COLLECTION & COORDINATION WITH DEPARTMENTS

Immediately after signing of the Contract, the consultant will attend the kickoff meeting at NHA headquarters and present his working schedule and confirm availability of resources as specified in the Technical proposal subsequent to which "Letter of Commencement" shall be issued by NHA. NHA shall also issue necessary authorization letter "To Whom It May Concern". Consultant will immediately mobilize and get possession of the relevant maps, reports and imageries for the feasibility study & detailed design of the Project. After the Completion of the design, SOP maps and imageries shall be returned to the Client in Original and un-damaged form.

The Consultant should inform the local police and administration before conducting all types of field surveys. Before planning the field reconnaissance, the consultant should coordinate meeting with the concerned departments particularly Provincial Highway Departments, Metrological, Geological, Survey of Pakistan and local authorities. Local city development / Highway Department shall also be consulted to know any future plans for city expansion etc. Tips for design of Bypasses shall be obtained as per local requirements if required with due



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consideration to NHA's Policy on Bypasses. In case of any discrepancy or design change, arising out at any stage of the project due to lack of coordination with the relevant departments, the Consultant shall be held liable for that design change. In such a case, the Consultant shall not only modify the design but will be subjected to penalty equivalent to 5% of the Total Contract Amount (excluding taxes).

Outcome of above activity shall be reported in the form of presentation to the client.

Task 2:	Reconnaissance Visit and Alignment Study Report
Outcome:	Consultant shall submit an Alignment Report based on outline design and ground validation. Recommend any changes, if required.
	Approval of alignment in presentation to the Client

3.5. RECONNAISSANCE VISIT WITH IDENTIFICATION OF ALIGNMENT ALTERNATIVES

After completion of the Task 1, the consultant shall carry out the desk study of existing /proposed alignment using maps, imageries, freely available DEM data followed by a site visit and ground validation. The site visits shall be carried out by a senior highway engineer of not less than 15 years of experience. Coordinated meetings with local departments shall be done and minutes recorded (same shall be made part of the Reconnaissance and Alignment report).

The Consultant shall highlight the merits and demerits of alignment options, considering the Technical viability, economy of Construction Cost and extent of physical difficulties to be encountered during construction and operational phase. The Consultant shall develop and submit a Map showing alignment alternatives (if any) and recommended Option duly marked on Satellite imagery & SOP Sheet.

During the reconnaissance visit, particular requirements of the project shall be identified that will be addressed in the detailed design. At the reconnaissance stage, social, economic and environmental aspects shall also be considered. The resulting information will form part of the recommendations for adoption of a particular corridor.

Other requirement of Task-2 is the submission of Inception Report. Inception Report should elaborate the methodologies for detail design and for requirements spelled out in the TOR and observations made in the site visit.

After submission of Alignment report and Inception report, the Consultant will give presentation of all alignment alternative along with recommended alignment with merits and



demerits to the Competent Authority in NHA for approval of alignment. The Consultant shall then carryout detailed design of the most feasible& approved alignment alternative.

Data from various sources shall be collected at this stage:

- Topographic Maps
- Available Geological reports, if any (from local departments, adjacent projects)
- Satellite Imagery&ASTER / SRTM Digital Elevation Model (DEM) Data
- Agriculture soil reports
- Soil survey maps (Soil survey of Pakistan)
- Flood Maps / Discharge Data

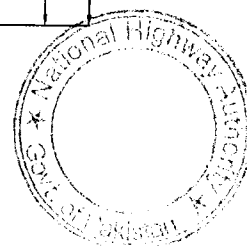
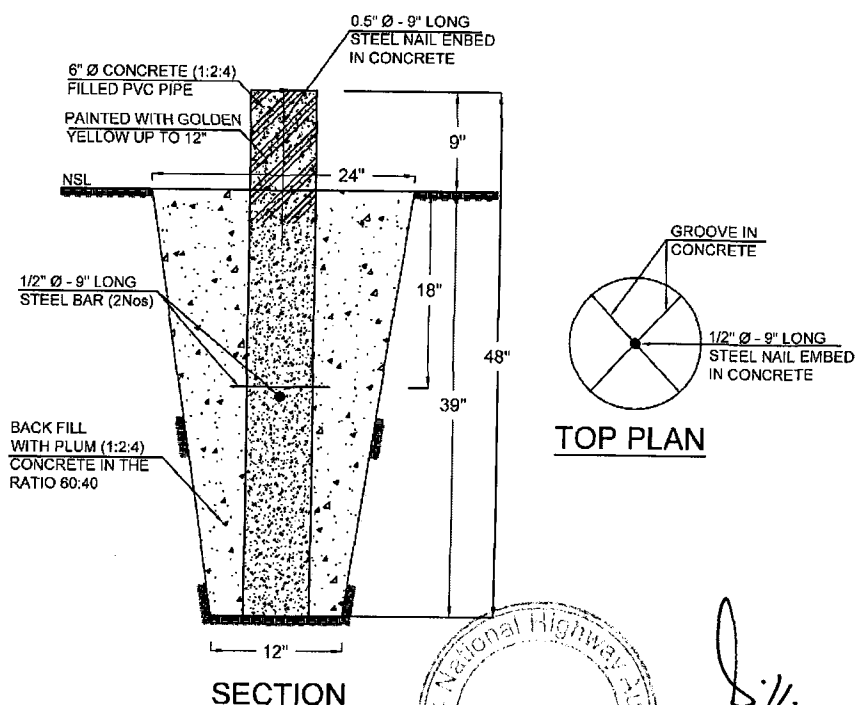
Task 3:	Topographic Survey
Outcome:	Consultant will perform Topographic Survey Submit Survey Report, Draft and Final Topographic Plans

3.6. TOPOGRAPHIC SURVEY

The consultant should use the latest technology for the topographic surveys, which include as many Dual Frequency Global Positioning System (DFGPS) for establishment of highly accurate control points. In case the consultant does not have the requisite number of DFGPS, he is advised to hire services of professional survey companies having the required expertise. The DFGPS shall be simultaneously used for enough duration to develop accurate control points.

The Survey company mobilizing to the site must comply with the requirement of the recent "Surveying & Mapping Act 2014". 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*. 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

SURVEY CONTROL



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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 complies with the Surveying and Mapping Act 2014.

3.6.1. Survey Monuments

Permanent Ground Monument made of Concrete 1:4:8 with 75 mm steel nail embedded at centre. The type and dimensions of Survey monuments to be installed at site is shown here. Using spray paint and a stencil, the monument number shall be painted.

Besides start and at the end, it is required that these markers shall be fixed in the traverse line at an interval of about 300 to 400 meters. These shall be fixed at such locations that these are least susceptible to disturbance and damage. The consultant shall fill out a Performa for each traverse station showing picture, sketch and reference with permanent ground features. If sub-standard monuments are used, then NHA will deduct the necessary amount from consultant's due payments.

3.6.2. Control for Traverse

Projection: UTM

Datum: WGS84

Vertical Datum: MSL

3.6.3. Horizontal Control

Precise Primary Controls (ITRF CONTROLS)

Minimum (2) DFGPS 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 100 km. Minimum observation time shall be at least ten (10) hours 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.

3.6.4. Primary Controls

DFGPS Primary Controls shall be established at a maximum distance of 10 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, which may be used for Total station if needed for topographic survey.



3.6.5. Secondary Controls

DFGPS Secondary Controls shall be established at a maximum distance of 333 meters with one base and two rovers 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.

3.6.6. 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 shall be related to monuments made for Horizontal primary and secondary controls with double run level to control the height as mentioned above.

3.6.7. 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.

3.6.8. Topographic Survey (Scale 1:1,000); 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 1:1,000.
- b. The Consultant is required to observe 10 cross-sections across the flow channels 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 upon which the Model study survey was done should be incorporated in the traverse/ level circuit.

3.6.9. Centerline Points (stake) and Measurement of elevation of route stake

- a. The distance between the centerline points shall be 25m 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.



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- 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 flyover shall be measured. For the places where the topography is changed and flyover pier and abutment, more stakes shall be established.
- f. The position of 10KV high-tension pole (tower) around the route within 100m, and the power line's lowest elevation on the crossing point.
- g. The stake's elevation shall be measured one by one.
- h. 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.

3.6.10. Cross section Points

- The cross section should be measured one by one.
- The cross section should be measured at 25m interval
- The cross section shall be measured to the ROW limit.
- For the alignment sections with proposed retaining wall, the cross section shall be measured at 5m interval.
- For the bridge pier, the measuring range of the cross section is 10m at both left and right sides of the center; whereas for the bridge abutment, the measuring range is till the ROW limits.

3.6.11. 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 recorded along with all break points to clearly define the canal shape.

3.6.12. 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 10 m interval, which is perpendicular to their axis. Minimum 5 points shall be 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.



3.6.13. Survey corridor

The detailed topographic survey in normal circumstances shall be carried out in a corridor of 50 m (15 m from CL on either side). At locations of crossing rivers & nullas, the detail of survey extent is given in respective sections.

3.6.14. Mapping (Unit of Measurement)

Metric units shall be used throughout.

3.6.15. Scale

Besides soft copy, mapping of drawings shall be plotted to a scale of 1:1,000.

3.6.16. Details to be shown

All natural or manmade erections above ground need to be depicted in the topographic survey. Enough points should be recorded, so that its clear picture including identification, size and elevation is available for the designer. The consultant should also depict underground utilities with markers available at site. Intelligent nomenclature need to be adopted to describe the feature. The information should be available in CAD software in layer format with fully defined attributes.

Buildings/Structure

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

Roads, Tracks and Footpaths

- Curb line or edge of surfacing to carriageways, and along the edge line markings.
- Tracks.
- Pedestrian bridges and footpaths.
- Traffic islands (similar to curb line).
- Destination of road for junctions' level.
- Bridges (over railway, river, etc.)
- Levels over railway line in case of at grade or grade separated crossings.
- In case of power transmission lines crossing alignment, level of electric wire with respect to survey control shall be recorded.



Road Furniture (In case of existing road)

- Km post (value to be noted).
- Bus stop facilities.
- Traffic signal posts and controllers.
- Guardrails.
- Road signs.

Ruins/Debris/Structures

- Ruins or partially demolished foundations-by the wall and masonry visible at the time of the survey
- Invert level of Drainage Structures

Survey

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

Slopes and Earthworks

- Cutting and embankments with any protection work done
- Terraced slopes
- Borrow pits / Quarries
- Retaining wall
- Rock outcrops
- Mining tips
- Indicate date of survey if on-going earthworks is present and mark the affected area

Services and Utilities

- Details

Water & Drainage

- The top of banks of all water features over 1.0-meter-wide shall be detailed and the bottom of banks as indicated by the water level at the time of the survey. The direction of flow of all river, streams and watercourses shall be indicated.
- 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.
- 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.



- The location of existing roads, bridges or river training works of Irrigation Department (if any) or else should be clearly indicated.

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

Bridge details

The bridge details shall be shown on a separate drawing for each bridge. The bridge observations shall include the following: -

- 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.
- The coordinates and levels of the bridge deck to the intermediate piers (if any) of the bridge.
- Length, width and type of construction of bridge.
- The type and location of services adjacent to the bridge.
- The coordinates and levels of the centerline and the road on the bridge at approximate intervals of 5 m.
- 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.

Culvert details

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

- Type of culvert and diameter.
- Chainage of culvert at the road centerline.
- Skew angle of the culvert from the centerline.
- Length of culvert from each side of the centerline.
- Invert levels of the inlet and outlet.
- 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 through recording enough points 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 roadway cross-section. For the existing carriageway, the width of carriageway, inner and outer shoulders should be clearly identified and coded.



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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 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 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 needed to define super-elevation changes at curve sections.

3.6.17. 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 filter the data. All data points with incorrect x, y or z values shall be removed. It is also important 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 to 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.



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TIN (Triangular Irregular Network) shall be developed by using software. Using TIN, Contour shall be generated. Since NHA uses AutoCAD Civil 3D for vetting, same shall be used by the consultant.

3.6.18. Grid

The coordinates of the DGM shall be referred to the grid system as described already in section 3.6.2 of this document. The coordinates of the DGM shall be Easting, Northing and elevations.

3.6.19. String Labelling

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.

3.6.20. 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 in the AutoCAD format. Such information shall be used by the Surveyor when preparing Land Utility folders at the end.

3.6.21. Contours

After digital data collection of survey points at site, the contour generation shall be done by using computer software. **The contour 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 collected very carefully 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 prism to record the coordinates.

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 the ground surface is obscured because of undergrowth, on-going earthworks, swampy areas, or other obstructions, or the access is restricted, contours can be shown by broken lines to indicate that their accuracy cannot be guaranteed but with prior approval of the Client.

3.6.22. Longitudinal Profile and Cross-Section

The longitudinal profile shall be plotted in A1/A3 size (as requested by Client) to a scale of 1:1,000 Horizontal and 1:100 Vertical with chainage interval of 25 m unless otherwise specified or instructed by the Client. The cross sectional plan of the existing road shall be plotted in A1 size to a scale of 1:200 both horizontal and vertical with 25 m interval. The plan shall show the chainage interval as specified and the existing ground profile and all the existing features.

3.6.23. Original Drawings & Preliminary Copies

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

3.6.24. Soft Submission of Data and Drawings

The Surveyor shall supply the digital ground model data, all Drawings, Reports suitable for input to the computer and according to the specification acceptable to Client. The survey data shall be supplied in CSV & DWG format.

The CD / DVD-R and hard copy shall be supplied with an index scheduling the contents and referencing and shall remain the property of the Client.

3.6.25. 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.

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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 and Drawings 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.

The Consultant is required to quote for "Topographic Survey" in Direct Cost Page which must include the cost of aforementioned survey activities including Report & Drawing Production, Instrument Rental Charges, Salary of Surveyor(s) & Survey Helpers etc. (complete in all respects)".

Task 4:	Structural Analysis
Approximate Duration:	20 Days
Outcome:	Flyover Design Report

3.7. STRUCTURAL ANALYSIS OF NEW FLYOVER

Structural Analysis shall preferably be performed using standard international software. All input files shall be provided in the design report.

3.7.1. Flyover Design Report:

- Project-specific design criteria regarding serviceability and safety, applicability of the design standards regarding design loads and materials.
- Definitions and magnitudes of loads such as: wind, seismic, and vehicular loads
- Modeling and analysis assumption, such as geometry and boundary conditions, load case definitions, load combinations and force envelopes.
- Gravity, wind and seismic load paths.
- Design of foundation and soil-structure interaction modeling based on geotechnical data.
- Deflections, movements and joint articulations.
- Dynamic characteristics and vibrations.
- Design of all components of flyover, including main members of superstructure, cables, substructure, foundation, their forces and their sizes, and their limit states for ultimate, fatigue and service.

3.7.2. Drainage at bridge:

- Design Drainage structures and if necessary, assess cross drainage requirements and propose new structures.



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- Provisions of side drains and its disposal at suitable locations.

Task 5:	Traffic & Axle Load Survey
Outcome:	Classified Traffic Surveys after approval of Client. Submit Traffic & Axle load survey report

3.8. TRAFFIC AND AXLE LOAD SURVEY

3.8.1. Field Books and Record

Traffic count forms the basis for capacity analysis, pavement design and economic analysis etc. Consultant is required to carry out atleast 3-Days, 24 Hours 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, generated & projected traffic. The consultant shall submit detailed program of traffic count along with locations, duration and repetitions in Inception report. 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.

As an evidence of Traffic Count Activity, the Consultant is required to submit Geo-tagged Photographs along with Date and Time Stamp of the Traffic Count Locations. Also, the Consultant will submit the originally filled Traffic Count Survey Forms duly stamped and signed by the Traffic Enumerators as well as the Traffic Engineer of the Consultant, failing to which the report shall not be acceptable.

3.8.2. 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.

3.8.3. Origin & Destination Survey

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



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3.8.4. Axle Load Survey

Consultant shall undertake atleast one day 24-hours 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.

As an evidence of Axle Load Survey Activity, the Consultant is required to submit Geo-tagged Photographs along with Date and Time Stamp of the Axle Load Survey Locations. Also, the Consultant will submit the originally filled Axle Load Survey Forms duly stamped and signed by the Enumerators as well as the Traffic / Pavement Engineer of the Consultant, failing to which the report shall not be acceptable.

In case, the Consultant fails to undertake Axle Load Survey, a penalty equivalent to twice the percentage / payment against Axle Load Task shall be imposed on the Consultant.

3.8.5. Underpass/Cattle Creep Survey

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

3.8.6. Traffic Diversion Plans

Since the existing road is heavily trafficked road, therefore, the Consultant is required to develop in-general proper Traffic Diversion Plans alongwith recommendations of all possible road safety measures on entire section where needed as per situation.

In addition to this, Traffic Diversion Plans shall also be provided for the following situations:

- a. At toll plazas (If required)
- 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 constructions like construction of box culverts and underpasses.
- f. At places where overhead bridge construction is likely to take place.

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



The Consultant is required to quote for "Traffic Survey" & "Axle Load Survey" in Direct Cost Page which must include the cost of aforementioned activities and cost of report writing, Instrument Rental Charges (if any), Salary of Traffic Engineer, Enumerators, etc. (complete in all respects)".

Task 6:	Soil & Material Investigation
Outcome:	Soil and Material Investigation Report

3.9. SOIL & MATERIAL INVESTIGATION

Soil & Material investigation shall be done to ascertain the index and engineering properties of encountered soil. 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.

Detailed program for mobilization and doing tests at site shall be submitted to the Client and after approval work shall commence. If the consultant wants to outsource the Soil & Material Investigation work, it will be mandatory to take prior approval of the Client. NHA will ensure that the firm is not black listed and has sufficient resources and registered with Pakistan Engineering Council. Also, the Consultant will supervise the soil & material investigation work in case he sublets the work to a Firm and shall submit an undertaking in this regard.

The consultant is required to carryout following steps:

- Determine needs of the design
- Carry out complete ground investigations
- Carry out complete laboratory testing
- Evaluate results for final design
- As per fixed horizontal and vertical alignment, identify the areas of deep cuts and high fills. Study precise geometry of the roadway structures and develop design requirements.

Field investigations shall be carried out in three main areas:

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

Enough samples with appropriate spacing is required to be investigated to fully analyze the ground conditions that shall be addressed with appropriate treatment for construction.



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Consultant is required to propose appropriate methodology to address the problems of embankment construction, if any.

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

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

3.9.1. 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 necessary to confirm the quantity and quality of available material. Test results from any nearby operational quarries should also be included.

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

Considerable amount of water is likely to be required for proper compaction of earthworks. 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. Tests to assess the suitability of water for concrete are necessary and shall be undertaken.

3.9.2. Soil Classification

Soil description is necessary for all test pits and bore 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 Colour, Composition, Grading, Particle shape, soil name and soil group. Both Unified and AASHTO classification shall be used.

As an evidence of Soil & Material Investigation Activity, the Consultant is required to submit Geo-tagged Photographs along with Date and Time Stamp of each investigated site. The Consultant is also required to submit Linear Plan of all the locations where Investigations have been carried out and same shall be made part of the Soil & Material Investigation Report. Also, the Consultant will submit the original Lab Reports / Testing Results duly stamped and signed by the Material Engineer of the Consultant, failing to which the report shall not be acceptable.



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Task 7:	Environmental Impact Assessment
Outcome:	EIA Report submission and obtaining NOC from PEPA

3.10. ENVIRONMENTAL IMPACT ASSESSMENT

As per EIA Rules, Consultant is required to carry out the EIA Study for the Project. It involves collection of required base line data from site, analysis and recommendation for mitigations. Findings shall be recorded in the form of Report which shall be reviewed by NHA EALS Section. The scope also includes submission of EIA Report to EPA Punjab, addressing their requirements, to their entire satisfaction (Including submission fee), conducting the Field hearing and obtaining NOC for NHA. All costs whatsoever shall be quoted. The detailed TOR for Environmental Impact Assessment is attached as Annex-B of this document.

The Consultant is required to quote for “Environmental Impact Assessment” in Direct Cost Page which must include the cost of aforementioned activities, cost of report writing, NOC Fee, Environmental Engineer Salary, Coordination with Pak EPA & Public Hearing Charges, etc. (complete in all respects)”.

For EIA, Consultant shall directly coordinate with GM (EALS) office. The Consultancy fee against the EIA shall be verified and processed by the office of GM (EALS).

Task 8:	Geotechnical Investigations for Structures
Outcome:	Geotechnical Investigation Report

3.11. GEOTECHNICAL INVESTIGATION FOR STRUCTURES.

Consultant shall appoint, after the approval of the Employer, a “Nominated Specialist Contractor” to perform geotechnical investigations including field and laboratory testing, for which a provisional sum of Rs. 4.0 million/- has been kept. After the formulation of exact scope of work for sub-surface investigations based on reconnaissance survey by the consultants and subsequent approval of NHA, the Consultant shall publish Request for Quotations for undertaking Geo-Tech Investigations in the leading newspapers as per PPRA Rules. After obtaining sealed quotations from reputed Geo-tech firms, same shall be opened & evaluated by the Consultant in accordance with the PPRA Rules, and the recommendations shall be given to NHA for nomination of Geo-Tech Firm / contractor. The Consultant has to ensure that the Geo-Tech firm is not black listed and has sufficient resources and is registered with Pakistan Engineering Council. Subsequent to approval of Client, work shall commence on site based upon a formal agreement between the consultant and contractor (including quantities, rates and work schedule). Detailed program for mobilization and doing tests at site



shall be submitted to the Client and after approval work shall commence. The Employer would pay the fee for this work agreed between both parties directly to the nominated specialist contractor after certification of work by the concerned Deputy Director (Maint) NHA and invoiced by the consultant. Consultant will supervise the sub soil investigation work to be carried out by Geotechnical Firm. An undertaking shall be given in this regard.

Sub-surface investigations consisting of boreholes / drill holes / test pits of required depth, supplemented by field and laboratory testing to accurately assess the engineering properties of the underlying soil strata for detailed design of foundations, substructures and roads shall be undertaken. A separate report will be prepared to this effect and will be submitted to NHA bearing approval of the Consultant.

Bore logs shall also be included in the report along with the laboratory results. Testing of samples collected from site shall be carried out in a reputed laboratory, under strict quality control and adherence to relevant ASTM procedures / standards. Depth of boring shall be decided by the geological formation at site and the type of foundations proposed for the structures. Standard penetration tests shall be started from the ground surface and carried out in accordance with ASTM D1586 Penetration Test and Split Barrel sampling of soils. Where clayey soils are encountered, undisturbed samples shall be obtained in accordance with ASTM thin-walled sampling of soils. Movie clip of 15 minutes at each location is required to be submitted.

The site investigation to be undertaken shall consist of the following: -

- Deep Machine boring to a maximum depth of 30m below ground level and associated field-tests for River Bridge Piles and for other structures.
- Trial Pits to a maximum depth of 3 meters.
- Hand auger holes to a maximum depth of 7.5 meters.
- Separate BOQ shall be prepared by the Consultant with all required tests for deep boring. It is required to carry out grain size analysis at required scour depth.
- Submission of proper site investigation report comprising all relevant notes and pertinent information required by this TOR together with laboratory test results. The above scope of work may be varied or deleted depending on the findings as the investigation proceeds. All Sections in this Specification and the Bill of Quantities, which relate to work or materials not required shall be deemed not to apply.

As an evidence of Geo-Technical Investigation Activity, the Consultant is required to submit Geo-tagged Photographs along with Date and Time Stamp of each investigated site. The Consultant is also required to submit Linear Plan of all the locations along the road (Left +



Right Side) where Investigations & Testing have been carried out and same shall be made part of the Geo-Technical Investigation Report. Also, the Consultant will submit the original Lab Reports / Testing Results duly stamped and signed by the Geo-Tech Engineer of the Consultant, failing to which the report shall not be acceptable.

Task 9:	Pavement Design
Outcome:	Pavement Design Report

3.12. PAVEMENT DESIGN REPORT

After the traffic count and projections for designed life of 10 years are done and the soil investigations data is available; the pavement design shall be done. The consultant shall get the basic design from AASHTO Pavement design guide-93, but final pavement design shall be done using mechanistic-empirical method. Asphalt Institute & Shell Model shall be used. Axle Load data and tyre pressure data to be collected and Kenlayer analysis software shall be used. All calculations shall be attached with the report.

Task 10:	Hydrology & Hydraulic Study
Outcome:	Hydrology Report

3.13. HYDROLOGY & HYDRAULIC STUDY

Conventional hydraulic impact using empirical connotations are not warranted, as they do not depict the real impact of food and flood routing in extreme flat land. It is strongly suggested to undertake the state of the art methodology with ground validation of land use and drainage patterns. **If the consultant wants to outsource the Hydrology and Hydraulic Study, it will be mandatory to take prior approval of the Client. The sublet firm must be registered with Pakistan Engineering Council and must be an experienced firm.**

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

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

3.13.1. Hydrological Data

Data shall comprise of following items:



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a) Topographic Maps

Maps are required to show the proposed highway alignment in relation to the drainage characteristics of the area being traversed. The available maps in this regard are Survey of Pakistan maps of 1:50000 scale. Proper catchment areas shall be marked for rivers & nullas. Same shall be made part of the reports.

b) Satellite Imagery

The satellite imagery shall be used for upstream and downstream to identify the land use and drainage characteristics. Photographs shall be taken for all crossings whose design flow exceeds 20 m³/s. Same shall be made part of the report. These photographs shall be of sufficient quality to enable the engineer to estimate channel roughness characteristics, nature & extent of vegetation cover, and land use. These pictures may be placed in the text or referenced in the text and compiled at the end of the Report.

c) Land Use

Using the topographic maps, satellite imagery and site visits, the engineer shall comment on the nature of the land use in the affected water sheds. Similarly engineer shall comment on the nature of vegetation and soil characteristics of the basins. Individual types of land use, vegetation, and soil classifications shall be indicated as percentages of basin area. The extent of anticipated changes within any of these areas shall also be indicated.

d) Water Use

Engineer shall comment on the use of the water within the affected drainage basins. If reservoirs are within the watersheds, the operational procedures of these reservoirs shall be described. Condition of bunds of reservoir if made by locals shall also be commented upon.

e) Rainfall Data

Rainfall data for the Project area, obtained from Meteorological department shall be made part of the report. The data shall consist of a brief description, the length of record, the accuracy, and the source (if other than Met department). Data collection shall be responsibility of the Consultant including paying any required fee from any source.

3.13.2. Hydrologic Analysis

Hydrologic analysis shall comprise of following steps:



a) Drainage Area

This exercise is done usually on the topographic maps. A field inspection of drainage basins is highly desired. If available, DEM model with satellite imagery can be used to simulate the drainage pattern of the area. In the field inspection, hydrologist shall record manmade features, such as agriculture terraces and dikes, which will intercept all of the runoff from the drainage area. These may include roadway/railway embankments. Once the boundaries of the contributing areas have been established, they shall be delineated on a base map and the areas determined. This is commonly using a scanned map in CAD software.

b) Watershed Parameters

Drainage basin characteristics shall be determined in the field or from available maps. The list of parameters below is based on the information needed by the various models used in the hydrological analysis. Some parameters will be inserted directly into a particular formula and others will be used in comparing one watershed to another for use in transferring data.

- Basin Length
- Basin Slope
- Percent Impervious
- Infiltration
- Detention Depression Storage
- Drainage Basin Roughness coefficient
- Channel or conduit slope
- Channel or Conduit Cross-section
- Channel or Conduit Roughness

c) Flood Models

Listed below are several methods for use in estimating peak runoff from drainage areas.

- Rational Equation: To be used for areas less than 50 ha
- Gumbel Distribution: Areas greater than 100 ha with gauging station data at the site.
- Indirect Estimates: Areas greater than 100 ha with gauging station data from neighboring watersheds.
- Regression Equation: Areas greater than 100 ha with rainfall data.



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Whether on of above methods or any other method is chosen to estimate the watershed runoff, the Engineer shall include in the hydrology report a copy of sample computation and any reference used.

The recurrence intervals for use with hydrologic computation shall be as follows:

Expressway	100 years (1 percent)
Arterials	50 years (2 percent)
Collectors	50 years (2 percent)

d) Rainfall Intensity

The rainfall intensity value used in the Rational Equation is based on the amount of rainfall that occurs, the time it takes for that rainfall to occur, and the recurrence interval associated with each design class. Statistical approach shall be used to develop IDF curves. Detailed calculations and IDF curves shall be made part of the Report.

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

3.14. HIGHWAY SAFETY AUDIT (HSA)

Pakistan is among those countries, where the road accidents and fatalities are high. One of the major components about 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 Highway Safety Auditor, at various stages, as per requirements of international standards.

Since the project in hand is selected for feasibility study and detailed design, the HSA shall be carried out with the submission of alignment report and shall conclude with the submission of final design report.

Detailed Audit shall be carried out under the supervision of NHA's Highway Safety Audit Expert. Other members of Highway Safety Audit team may include a third party expert. An Engineer from NHA Design & Planning section shall be made part of the Highway Safety Audit team. Consultant is required to arrange the Highway Safety Audit visit, collection of required data, field visit, coordinate meetings and compilation of final Audit report including proceedings and Consultant shall bear all the expenses, transport, boarding & lodging, etc. of the Highway Safety Audit Team.

The cost of carrying out Highway Safety Audit including expense of all aforementioned items are meant to be included in the other payable items.



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Task 12:	Stakeout of Design Alignment
Outcome:	Centerline staked out at site with permanent markers

3.15. STAKEOUT OF ALIGNMENT ON GROUND

After the Design drawings are approved, the Consultant shall be asked to stake out the alignment on ground. The Centerline markers shall be fixed on ground at 25 m interval. A 1.5m long PVC pipe 4" diameter filled with lean concrete and orange colour spray paint shall be erected. All verification and payment shall be processed by the Nominated project director of NHA.

The Consultant is required to quote for "Stake out of alignment on ground" in Direct Cost Page which must include the cost of aforementioned activities, report writing, Instrument Rental Charges, Salary of Surveyors, Helpers, etc. (complete in all respects).

Task 13:	Land Acquisition & Utility Folders
Outcome:	Land Acquisition & Utility Folders

3.16. LAND ACQUISITION AND UTILITY INFRASTRUCTURE REPORT

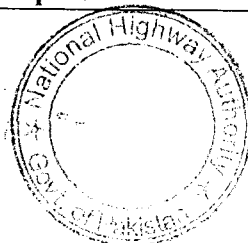
The consultant shall identify land and property falling within the right of way (ROW) to be acquired. The consultants shall submit 5 copies of ROW plans showing the alignment and defining the Right of Way to facilitate timely action for acquisition of land. The Consultant shall also prepare estimate for acquiring any additional land and removal of structures and utilities, particularly in the built-up areas along with complete details of land owners as per Shajra Parcha as per Provincial Department Record. The Consultant shall also include the following information in the Land Folders:

- Details of Trees (Numbers, Types, Girth, etc.)
- Permanent Points
- Graveyards, Mosques, other Religious / Worship Places, etc.
- Government Schools
- Names of Villages and Towns
- Government and Private Land falling in the proposed corridor

Folders shall be submitted in soft format in CAD with reference to grid coordinates.

ROW permanent markers shall be set up by the consultant, upon request. The markers as per NHA specifications shall be erected and payment shall be verified and processed by the Project Director directly.

Task 14:	Construction Machinery Report
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Outcome: Construction Machinery Report

3.17. 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 report shall be forwarded by the concerned Design Manager to the Procurement and Contract Administration Section of NHA along with the Contract Documents for use during Bidding of the Project.

Task 15: Preparation of Feasibility Study
Outcome: Feasibility Study Report

3.18. FEASIBILITY STUDY REPORT

The Consultant shall submit a detailed feasibility report encompassing the technical / economic viability of the project after carrying out preliminary design and necessary investigations. The basic data, result of investigations and studies as well as preliminary design estimates and evaluation shall be collected in a condensed and comprehensive form, in the feasibility report. Benefit cost methodology, cost appraisals of alternatives, benefit cost ratio, net present value, economic internal rate of return, sensitivity analysis, shall also be made part of the report.

Note: The Consultant based on the Reports of Topographic Survey and Traffic Survey is supposed to recommend design of either 4-lane or 6-lane flyover along with proposal of any alternative options for alignment i.e. bypass etc. (if required)

Task 15: Mass Haul Diagram
Outcome: Mass Haul Diagram

3.19. MASS HAUL DIAGRAM

Consultant shall submit the mass Haul Diagram which shall be represented directly below the longitudinal section of the alignment plan. It shall clearly depict the following:

- the distances over which the cut and fill will balance
- quantities of materials to be moved and direction of movement
- areas where earth have to be borrowed/wasted and amounts involved



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

3.20. FORMULATION OF PC-I

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

Separate PC-I for land acquisition shall be prepared and submitted. Subsequent revision shall also be done by the Consultant, if required.

Task 17:	Tender Documents
Outcome:	Submission of Tender Documents

3.21.1. TENDER DOCUMENTS

Tender Documents shall comprise of the following: -

a. **Volume-III**

- Particular Specifications, Special Provisions and Bills of Quantities.

b. **Volume-IV**

- Drawings as per the following detail:
 - Title Sheet
 - Sheet Index
 - Key & Location Plan with Coordinates 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) with locations of applications
 - 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



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- Drawings for Large structures
- Drawings for Earth retaining structures
- Drawings for Service Areas, Toll Plazas, Weigh Bridges, Pedestrian Bridges, Electrification Works, etc.
- 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

c. **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 standardized 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.

d. **Technical & Particular Specifications**

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

e. **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.

f. **Engineer's Estimate**

Consultant shall prepare the Engineer's Estimate of the project based on the detailed design, drawings and final Bill of Quantities, using NHA Schedule of Rates (2014) or latest, if any. For items not specified in NHA CSR, rate analysis shall be provided based upon market price.

For review of Engineer's Estimate, the Consultant shall provide the following:

- Backup calculations / Measurement Sheets of the Engineer's Estimate in soft editable format.



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- Earthwork Cross-Sections generated at every 25m interval. Same shall be submitted in a separate folder titled “Cross-Sections” for verification of the earthwork quantities.
- The Consultant shall also submit a “Project Data Sheet” showing the location and dimensions of bridges, culverts, subways, underpasses, cattle creeps, retaining & breast walls, traffic & road signs, slope stability works etc.

g. Certificate of Technical Sanction

As per Para 55-65, Chapter-Two, NHA Code, Vol-I & NHA’s Circular No. 11(19)/Secy(Coord)/NHA/15/569 dated November 04, 2015, the Consultant is required to submit a certificate which is to be used for obtaining technical sanction of the project from the competent authority. A standard certificate is attached at Annex-B.

3.21.2. Final Presentation

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

Important Features of Presentation:

- Consultant will describe the selected road alignment, merits, demerits, land acquisition and other impediments (if any).
- Consultants will highlight important components of project like major bridges, flyovers, interchanges, service areas and landslides etc.
- Important parameters of sub-soil investigation like CBR, Pile Capacity and General Soil Classification etc.
- Consultant will also highlight the environmental impact of the road construction on the road influence areas.
- Important hydraulic parameters used in the design of bridges over rivers/ canals.
- Results of traffic study and axle load survey.
- Location of quarry sites
- Consultant shall clearly explain the traffic management plans.
- Complete description of design criteria and functional requirements.
- Description of specialised equipment and machinery required for the construction.
- Description of methodology/ codes for pavement and structural design including details of computer models.



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- For Structural Design, Summary of results of computer output (especially maximum and minimum forces for all elements) in tabulated form shall be presented.
- A plan showing major quarry sites/ borrow area sites including mass diagram showing cut and full along the finally selected alignment shall be presented.

Any other points, which the consultant may like to highlight, should be included.

3.21.3. Submission of Documents

All the Reports associated with each Task shall be submitted as stated in respective sections. **In the technical proposal, consultant shall develop a Work programme Task wise with submission dates. Failing to provide the same, the proposal shall not be evaluated.**

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

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

3.21.4. Provision of Data on Compact Discs

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

3.22. PERFORMANCE OF THE CONSULTANT

The Consultant shall attend the pre-bid meeting with bid preparing team (coordinator only is not acceptable). The performance of the Consultant with reference to his response to the queries of the contractors shall be evaluated and recorded by GM (P&CA) & GM (Design).

- During the construction phase, the design review shall finally reveal the performance status recorded by the Design Section.
- The performance of the consultant shall be evaluated based on the performance status recorded by the Design Section. Performance evaluation shall be done by concerned experts of Pavement, Structure, Geometry & Cost Estimation. Each expert shall evaluate rating of consultant based on timely submission, quality of submission and



responsiveness of consultant. The overall performance rating based on the inputs from all experts shall be made in the following manner:

A+	Excellent
A	Good
B	Requiring improvement
C	Poor

- c. "B" performance rating without subsequent improvement shall drop the consultant performance to the stage "Poor". If "C" 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.

3.23. MODE OF PAYMENT:

"A" is the Contract amount, excluding the Provisional Sums

Sr. No.	Description	% age of Total Amount
STAGE-I		
1.	Inception Report	5%
2.	Reconnaissance visit and Alignment Study Report including all the requirements spelled out in the TOR along with recommendations.	5%
Sub Total (A)		10%
STAGE-II		
3.	Topographic Survey Drawings & Report	LS
4.	Traffic Survey Report	LS
5.	Axle Load Survey Report	LS
6.	Pavement Design Report including Existing Pavement Evaluation	5%
7.	Geometric Design Report& Drawings	5%
8.	Structure / Flyover Design Report& Drawings	5%
9.	Soil and Material Investigation Report	5%
10.	Geo-technical Investigations Report	PS
11.	Hydrology & Hydraulic Study Report	5%
12.	Highway Safety Audit Report	5%
13.	Stake out of alignment on ground / Ground Validation.	2.5%
14.	Land Acquisition & relocation of Utility Infrastructure Folders and ROW Plans showing the alignment and total area to be acquired, if required	2.5%
15.	EIA Report	LS



Sr. No.	Description	% age of Total Amount
16.	Construction Machinery Report	5%
17.	Draft & Final Feasibility Report	10%
Sub Total (B)		50%
STAGE-III		
18.	Final Tender Documents & Drawings (Volume I – IV) including BOQ, Engineer's Estimate, C-factor, Spécial Provisions alongwith Backup / Design Calculations in hard and soft (pdf. + CAD file)	10%
19.	Mass Haul Diagram	5%
20.	Traffic Diversion/Management Plan	5%
21.	Drainage plan for surface runoff and urban areas	5%
22.	Final Design Report (including detailed Structural, Geometric, Tunnel, Hydraulic, Pavement Design & Slope Stabilization along with Backup calculations)	5%
23.	Draft & Final PC-1	10%
Sub Total (C)		40%
TOTAL (A+B+C)		100%

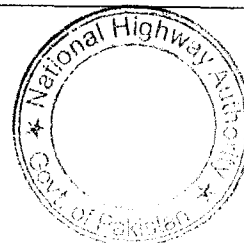
Upon checking the report that it is in line with the TOR, 50% payment shall be released. Remaining shall be released upon acceptable quality is ensured. Upon initial submission, a checklist correlating to TOR requirement shall be attached and checked for requirement spelled out.

Final payment shall not be cleared until Consultant gives a satisfactory final report and until consultant submits soft copies of all documents/reports/drawings. Furthermore, no EOT shall be required for the balance payments against each report.

3.24. DELIVERABLES:

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

Sr. No.	Description	Numbers
STAGE-I		
1.	Inception Report	03 Hard Copies + 01 Soft Copy
2.	Reconnaissance Report	03 Hard Copies + 01 Soft Copy



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Sr. No.	Description	Numbers
3.	Alignment Study Report along with Map showing recommended Option duly marked on Satellite imagery.	03 Hard Copies + 01 Soft Copy
4.	Presentation of recommended alignment with merits and demerits for approval by NHA	03 Hard Copies + 01 Soft Copy
STAGE-II		
5.	Topographic Survey Drawings & Report	03 Hard Copies + 01 Soft Copy
6.	Traffic Survey Report	03 Hard Copies + 01 Soft Copy
7.	Axle Load Survey Report	03 Hard Copies + 01 Soft Copy
8.	Pavement Design Report including Existing Pavement Evaluation	03 Hard Copies + 01 Soft Copy
9.	Geometric Design Report& Drawings	03 Hard Copies + 01 Soft Copy
10.	Structure / Flyover Design Report& Drawings including Existing Structure Evaluation	03 Hard Copies + 01 Soft Copy
11.	Soil and Material Investigation Report	03 Hard Copies + 01 Soft Copy
12.	Geo-technical Investigations Report	03 Hard Copies + 01 Soft Copy
13.	Hydrology & Hydraulic Study Report	03 Hard Copies + 01 Soft Copy
14.	Highway Safety Audit Report	03 Hard Copies + 01 Soft Copy
15.	Stake out of alignment on ground / Ground Validation.	03 Hard Copies + 01 Soft Copy
16.	Land Acquisition & relocation of Utility Infrastructure Folders and ROW Plans showing the alignment and total area to be acquired, if required	03 Hard Copies + 01 Soft Copy
17.	EIA Report	03 Hard Copies + 01 Soft Copy
18.	Construction Machinery Report	03 Hard Copies + 01 Soft Copy
19.	Draft & Final Feasibility Report	03 Hard Copies + 01 Soft Copy
STAGE-III		
20.	Final Tender Documents & Drawings (Volume I – IV) including BOQ, Engineer's Estimate, C-factor, Special Provisions along with Backup / Design Calculations in hard and soft (pdf + CAD file)	15 Hard Copies + 01 Soft copy
21.	Mass Haul Diagram	03 Hard Copies + 01 Soft copy
22.	Traffic Diversion/Management Plan	03 Hard Copies + 01 Soft copy
23.	Drainage plan for surface runoff and urban areas	03 Hard Copies + 01 Soft copy
24.	Final Design Report (including detailed Structural, Geometric, Tunnel, Hydraulic, Pavement Design & Slope Stabilization along with Backup calculations)	03 Hard Copies + 01 Soft copy
25.	Draft & Final PC-1	85 Hard Copies + 01 Soft copy



Note: The soft copy will also be submitted in the format compatible with document i.e. Word, Excel, CAD, etc. One copy in PDF must be provided along with.

In addition, the Consultants should perform following actions and incorporate in their submissions:

- i. Alignments (all possible options) marked on SOP sheets should be submitted at the outset of the project along with Inception Report.
- ii. Consultants will get approval of location/concept of Bridges& Tunnels from NHA Design Section before embarking on detailed structural designs.

It is reiterated that all documents/ drawings shall be subject to review and checking by NHA's In-house consultants. Consultants will incorporate any comments/ modifications made by the NHA's In-House Consultants (if agreed, the responsibility for correctness of design lies with the Consultants). Consultants will provide two additional sets of the tender documents and reports to the Client at a later stage at no extra cost to the Client. Additional number of sets (if required) shall be provided at a cost of Rs. 5,000/- per set.



ANNEXURE - A
STANDARD CERTIFICATE FOR TECHNICAL SANCTION



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CERTIFICATE FOR TECHNICAL SANCTION

This is to certify for the project titled "**Name of Project**" "**(Length)**" that:

- (i) The Cost of Final Engineer's Estimate is Rs. _____ based on NHA's CSR _____;
- (ii) The provided design has been carried out in a professional manner and to the best abilities of the Consultant;
- (iii) The design carried out is in compliance with the requirements of Terms of Reference provided by NHA and cognizant with the recommendations put forth in the reports and applicable codes;
- (iv) The proposal is structurally sound and that the estimates are accurately calculated and based on adequate data.

For and on behalf of Consultant

Sign & Stamp: _____

Name of Authorized Representative: _____

Name of Consultant: _____

Dated: _____



P/L

Feasibility Study and Detailed Design for Construction of 4-Lane Flyover at Bhara-Kahu (N-75) (3.5-KM)

MANPOWER REQUIREMENTS

Sr. No.	Key/ Proposed Staff Position	No. of Persons	Individual Man Months	Total Man Months
A. Professional/ Key Staff				
1	Team Leader/ Sr. Highway Engineer	1	4.00	4.00
2	Structural / Bridge Engineer	1	4.00	4.00
3	Highway Engineer	1	1.00	1.00
4	Hydraulic / Drainage Engineer	1	0.50	0.50
5	Electrical Engineer	1	1.00	1.00
6	Highway Safety Engineer	1	1.00	1.00
7	GIS Expert	1	0.50	0.50
			Sub-Total	12.00
B. Non Key/ Support Staff				
1	Quantity Surveyor	1	4.00	4.00
2	CAD Operators	2	3.00	6.00
3	Computer Operators	2	4.00	8.00
4	Helpers	2	4.00	8.00
5	Peons	2	4.00	8.00
			Sub-Total	34.00
			Total Man-Months	46.00



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 adverse impacts 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 Climate Change, 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 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.



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- ii) **Project Categorization.** The Consultants should categorize the project (category A or B and IEE or EIA) as per Environmental Protection Act and guidelines & procedures derived therein and as per donor agencies Environmental Safeguards and Policies which ever are applicable.
- 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,



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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.



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ii) NOISE LEVELS:

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

iii) WATER QUALITY:

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

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

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

- Their potential environmental and social impacts;
- Capital and recurrent costs;
- Suitability under local conditions; and
- Institutional, training and monitoring requirements.



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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 (GRM).** An effective, feasible and project Specific GRM will be proposed with all required details.
- 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 EMP cost plus monitoring cost together will be minimum 1% of total project cost so that these can be implemented in true letter & spirit at later stages. Same cost will be given in PC-1 for EMP. This cost will be part of Bill of Quantities as separate item. 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, environmentally sound camp sites & borrow pits identification, mapping and characterization, 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



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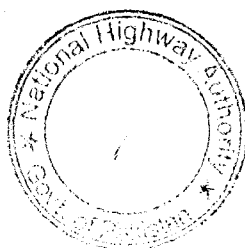
monitor the rehabilitation of borrow areas and the restoration construction campsites according to EMP report. The monitoring plan should ensure the safe disposal of excess construction materials. Consultants should also evaluate the effectiveness of the mitigation measures proposed in the EMP and recommend improvements if necessary. Apart from regular compliance checks the Consultants should generate a tabular matrix for air, water and noise analysis, asphalt plant emissions, soil erosion and contamination, plantation, safety and traffic rules compliance for construction and operation phases.

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

- xi) **Economic Assessment.** This section should include the overall cost estimate in relation to the project benefits, environmental costs and total cost of the proposed project. The Consultants should address the cost analysis of training, monitoring activities, environmental analysis and activities, resettlement, land and property acquisition, and mitigation measures.
- xii) **Role of Functionaries and Government Agencies Involvement.** This section should include role of all the functionaries and variable involvement of government agencies or authorities for the project accomplishment.
- xiii) **Recommendation and Conclusions.** An adequate summary should emphasize on the project description and environment, environmental impacts and mitigation measures, alternatives, socio-cultural and socio economics, public consultation and the resulting issues and recommendations, environmental management and monitoring plans, economic assessment, recommendation and conclusions.
- xiv) **Submission of Reports.** The report should be prepared and presented in strict conformity to IEE/EIA regulations, 2000 and Guidelines for preparation and submission of IEE/EIA 1997 issued under the Pakistan Environmental Protection Act, 1997.

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

The reports should include acronyms list and a copy right certificate in the name of NHA. The reports should include all the key articles but not limited to the executive summary, introduction, description of the project, policy, all legal and administrative framework, description of the project environment, alternative analysis,



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environmental impacts and mitigation measures, public consultation and resettlement action plan, inter-agency and public/ NGO consultation process, environmental Management & 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) It will be the responsibility of EIA Consultant to arrange joint visit (Consultant and Environment NHA HQ team) to the field before finalization of EIA Report.
- (iii) After incorporating the comments from NHA, bureau of Environmental Protection/Provincial EPAs and donor agencies Consultants should finalize the report.
- (iv) Consultants required submitting two hard copies and one soft copy of final EIA report to NHA.
- (v) 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, estimates & sources of water & powers usage, estimates of liquid & solid waste generation for the project construction and number of labor force (employees) required for the project construction and operation phases.
- (vi) 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 fulfilling all codal requirements. Further to this publishing of advertisements regarding public hearing and preparation of presentations, banners, sitting arrangements and all other will be responsibility of the consultant.

Consultants' Fee for Services:



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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.	20%
(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.	30%
(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 four (04) months from the Date of Commencement of Services.

Non Compliance: If consultant fails to comply NHA's instruction and is not able to obtain NOC from concerned EPA in minimum defined period in law; 50% of total cost will be deducted what so ever the reasons are.



*Revised
17/11/19*