PAKISTAN RAILWAYS
HEADQUARTERS OFFICE, LAHORE PAKISTAN

2nd C O R R I G E N D U M

Tender No: 844-W/450(S&C) Tender. with TS310596E

FEASIBILITY STUDY FOR UP-GRADATION / REHABILITATION OF EXISTING AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL – SHORKOT – CHAK JHUMRA – SANGLA HILL – WAZIRABAD (324 KM) & SHAHDARA BAGH – SANGLA HILL (90 KM) RAIL LINK

As a result of pre-bid Conference held on April 10, 2017, date of submission of Request for Proposal (RFP) which was fixed as **5th May, 2017** has been extended up to **25th May, 2017.** Addendum No.1 to RFP has been issued. Addendum No.1 and Minutes of meeting of pre-proposal conference held on 10-04-2017 can be downloaded from Pakistan Railway's official website: www.pakrail.com or PPRA's website www.ppra.prg.pk.

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ADDENDUM NO.1 TO RFP
FEASIBILITY STUDY FOR UP-GRADATION / REHABILITATION OF EXISTING AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL – SHORKOT – CHAK JHUMRA – SANGLA HILL – WAZIRABAD (324 KM) & SHAHDARA BAGH – SANGLA HILL (90 KM) RAIL LINK

As a result of pre-bid Conference held on April 10, 2017, this addendum is being issued to provide clarifications, additions, amendments and / or corrections to the above mentioned RFP. This addendum shall be deemed to form part of the RFP.

Clause No. 2.15.2.: Request for Proposal

1. **Clause No. 2.15.2 is deleted**

Paragraph Reference No. 2.17.5: DATA SHEET, Request for Proposal

2. **The last date for submission of proposals, mentioned in DATA SHEET against Paragraph Reference 2.17.5, that was fixed to 5th May, 2017 at 2 pm is changed to 25th May, 2017 at 2 pm.**

Paragraph Reference No. 2.19.1: DATA SHEET, Request for Proposal

3. **Following Text is added at the end of Criteria, mentioned in DATA SHEET against Paragraph Reference No. 2.19.1**

"

$$\text{Technical Score} = \frac{A_1[40]}{100} + \frac{A_2[40]}{100} + \frac{A_3[20]}{100}$$

The minimum technical score required to pass is: 70 Points
*Further details of Evaluation Criteria are described in Appendix-I to Data Sheet***"**

Appendix-II to DATA SHEET, Request for Proposal

Appendix-II to Data sheet is deleted and replaced with the following.

1. **"***The professional having experience less than minimum specified, in table below, shall not be considered.*
2. *Similar project has been defined under definitions for the purpose of comparison of the projects completed by the Consulting firm and assignment under consideration. For various professionals, the similar assignment shall be as per their respective field of specialization.*
3. *Masters degrees in relevant subjects only will be considered in evaluation. Relevant Masters degree are mentioned.*

Sr. No.	***Position***	***Min-Qualification***	***Relevant Master Degree***	***Overall Experience***	***Min-Relevant Experience***
1	*Project Manager (Permanent way Expert)*	*B.Sc. Civil Engineering*	*Masters degree or certification in Project Management or Masters in Rail Track Engineering*	*20 years*	*10 years*
2	*Railway Expert / Bridges & Structures*	*M.Sc. Structure Engineering*	*-*	*15 years*	*8 years*
3	*Railway Alignment Design Expert*	*B.Sc. Civil Engineering*	*Transportation Engineering*	*15 years*	*8 years*
4	*Railway Expert / Train Operation*	*B.Sc. Civil Engineering / Mechanical Engineering or any transportation expert with graduation and inducted in railways under occupational group of railway (Traffic & Commercial)*	*Any Masters Degree*	*15 years*	*8 years*
5	*Railway Expert / Signaling & Telecom*	*B.Sc. Electrical / Signaling /Telecommunication Engineering*	*Masters or Post Graduate course for Railway Systems Engineering*	*15 years*	*8 years*
6	*Railway Expert / Electrical*	*B.Sc. Electrical Engineering*	*Electrical Engineering*	*15 years*	*8 years*
7	*Railway Expert / Mechanical*	*B.Sc. Mechanical Engineering*	*Masters or Post graduate courses in Railway Rolling stock,*	*15 years*	*8 years*
8	*Transport Economist & Financial Specialist*	*M.Sc./M.A Economics / CA*	*-*	*15 years*	*8 years*
9	*Environmental & Social Expert*	*M.Sc. Environmental*	*-*	*15 years*	*8 years*

Sr. No.	*Position*	*Min-Qualification*	*Relevant Master Degree*	*Overall Experience*	*Min-Relevant Experience*
		Engineering / Sciences			
10	*Transportation Expert*	*Master in Transportation Planning / Engineering*	*-*	*15 years*	*8 years*
11	*Geologist / Tunnel Expert*	*M.Sc. Geology / Mining Engineering*	*-*	*15 years*	*8 years*
12	*Geo-Tech Expert*	*M.Sc. Geotechnical / Geological Engineering*	*-*	*15 years*	*8 years*
13	*Hydrology Expert*	*M.Sc. Hydrology/Water Resources Engineering./Hydraulics Engineering*	*-*	*15 years*	*8 years*
14	*Topographic Survey Expert*	*B.Sc. Civil Engineering*	*M.Sc GIS*	*10 years*	*5 years*
15	*GIS Expert*	*M.Sc. GIS*	*-*	*10 years*	*5 years"*

Clause No. 3. Scope of Work: Terms of Reference

1. **Item No. (ii)**

   Item no. (ii) is deleted and replaced with the following text

   "Bridge Analysis of major and key bridges which require Rehabilitation / Extension / Reconstruction to maintain desired operational speed and axle load as mentioned in Appendix-B. The remodeling or extension of bridges, if necessitated by changed hydrology, will be examined on the basis of bridge data provided by Client "

2. **Item No. (v)**

   a) The word "(where possible)" in second last line of item No. (v) is deleted.

   b) Following text is added at the end of item No. (v)

   "The alignment design that is required to ease out sharp curves and grades must be carried out on "Bentley Rail Track"Software or equivalent. The Consultant must calculate Land acquisition and Resettlement charges that may be required in the result of re-alignment of sharp curves and grades. "

3. **Item No. (vii)**

Item no. (vii) is deleted

4. **Item No. (x)**

Following text is added at the end of Item no. (x).

"For the sake of mapping in thematic layers, high resolutions satellite images (0.6m) is to be procured."

Clause No. 3.4: Study for Up-gradation/conversion of Level Crossings: Terms of Reference

5. **Body of Clause no. 3.4 is deleted and replaced with the following**

"The Consultant shall study 40 most hazardous level crossings(LXing) (at grade crossings) with a view to increase the safety of train and road users. Where hazardous is defined as

$$\text{Hazard of LXing} = \text{Average Annual Number of Accidents} \times \left(\text{No. of Causalities} + 1 \right) \times \left(\text{Financial Damage (Rs.In Million)} + 1 \right)$$

The Consultant shall prepare a comprehensive report about level crossings after taking into consideration visibility of level crossing from track and road, previous accident history, interlocking arrangements, condition of road and road traffic data based on an appropriate census in consultation with Client. Based on the analysis the Consultant will also suggest provision of flyover or underpass and up-gradation of un-manned level crossings into manned level crossing besides shifting, to mitigate chronic problems or closure where above conditions of traffic data do not warrant further retention of level crossing. Consultant must conduct 7days of traffic count on above stated each Level crossing for 12 hours each day. The start and end of survey time on each day will be decided on the basis of nature and Peak hour of traffic. On the basis traffic count, number of trains and Annual Average number of accidents Consultant will calculate Risk Index (RI) for each Level crossing. Risk Index can be calculated as follows:-

$$\text{Risk Index of LXing (RI)} = \text{Weekly Average Daily Traffic Count} \times \text{Number of Trains for that particular Section} \times \text{Average Annual Number of Accidents}$$

On the basis of Risk Index the Consultant after mutual consultation with Client will suggest up-gradation or conversion of each level crossing using following criteria:-

Item	***Risk Index***	***Up-gradation / conversion required***
*1**	*RI < 6,000*	*Remain Unmanned level crossing*

Item	*Risk Index*	*Up-gradation / conversion required*
*2**	*6,000 </= RI < 10,000*	*All unmanned level crossings to be manned on programmed basis*
*3**	*10,000</=RI*	*Road flyover / Underpass*

**The Limits of Risk Index in above table may be adjusted after mutual consultation between Client and Consultant on basis of severity of accidents history and overall results of traffic count.*

The data for accidents will be provided to successful Consultant. The Consultant shall also estimate the cost of such up- gradation and include it in the overall cost estimate of up-gradation of subject section."

Clause No. 3.2, Bridge Condition Survey and Rehabilitation / Extension / Reconstruction for bridges: Terms of Reference

6. **Clause no 3.2 along with its sub clauses is deleted and replaced with the following text.**

"

"3.2. Bridge Analysis for Extension / Reconstruction of Bridges.

The summary of bridges showing various types is attached as Appendix-C.
The Client will provide available data of the bridges. The Consultant shall carryout detailed analysis of all the bridges on the basis of provided bridge data of various types and will draw their conclusions and recommendation along with comprehensive plan for reconstruction/ rehabilitation and strengthening, of all bridges along with the cost.

3.2.1. Structural Analysis of Selected Bridges

Based on the bridge data, provided by Client, fully integrated models of bridges shall be developed and analyzed by the Consultant for both ***super structure and sub structure****. Finite Element Analysis Programs (e.g. SAP 2000 and Staad Pro or any latest version of equivalent software patent in market) shall be used to determine the effects of increased loads on these structures. This assessment/analysis will be carried out in accordance with the relevant provision of AREMA, Pakistan Railways Bridge Rules-1970, AISC and ACI specifications. The loads to be applied include dead, live and impact loads, tractive effort, breaking force, centrifugal, longitudinal, wind, stream flow, buoyancy, seismic and other applicable loads/forces and their prescribed combinations.*

According to sub-section (ii) of the Scope of Work, the existing bridges are to be analysed for speed and axle load as mentioned in Appendix-B and for train operation with D.E locomotives and trailing load comprising of high capacity freight wagons.

3.2.2. **Interpretation of Results**

The results of structural analysis shall be studied in detail to arrive at logical, reliable and efficient rehabilitation / strengthening measures required to upgrade the life expectancy and load carrying capacity of the structure under study. If the above testing and analysis reveals that any strengthening measures will not be sufficient enough, demolition and reconstruction shall then be proposed.

3.2.3. Reporting and Presentation

The results of detailed investigation and analysis shall be presented to the Client for each studied structure and the recommendations / action plan given for each category of bridges (type / size / location) based on these studies. Recommendations shall be made for requisite rehabilitation / strengthening procedures to be followed for increasing the durability and reliability against intended loads and speeds as mentioned in Appendix-B. Preliminary designs and sketches for these rehabilitation/strengthening works shall also be appended to the report along with Preliminary cost estimates.

The proposed works shall be developed based on considerations of economy, constructability, durability, environment, strength, and serviceability. A tentative plan for carrying out rehabilitation/strengthening activities shall be provided in the report."

Clause No. 3.7.4. Plan and Profile of the entire corridor: Terms of Reference

7. **Item No. (ix)**

Item No. (ix) is deleted and replaced with following text

*"**ix)**.Consultants shall also prepare longitudinal profile at the centre of the existing track and centre of new alignment to be plotted on 1/2500 horizontal and 1/100 vertical scale."*

Clause No. 3.9: Geotechnical Investigations: Terms of Reference

8. **Clause no. 3.9 along with its sub clauses is deleted**

Clause No. 3.16. Study for improvement / establishment of maintenance facilities for Locomotives, Carriages & Wagons.: Terms of Reference

9. **Main Heading of Clause No. 3.16**

Main Heading of Clause No. 3.16 is changed from **"Study for improvement / establishment of maintenance facilities for Locomotives, Carriages & Wagons"** to **"Study for train operation and improvement / establishment of maintenance facilities for Locomotives, Carriages & Wagons"**

10. **Body of Clause No. 3.16**

Following text is added at the end of body of Clause No. 3.16

"Based on the future traffic demand determined under clause 3.8 of the TOR, the consultants shall develop train operation plans for all the sections included in the feasibility study, keeping in view the tractive effort, horse power, operating schedules,

journey times and turn rounds etc. of the proposed locomotives and rolling stock both for the projected passenger and freight trains."

Clause No. 3.21. Certification of Pakistan Railway Officials: Terms of Reference

11. Clause No. 3.21 is added in TOR

Clause No. 3.21 states that

"Consultant shall arrange training program of Bentley Certification for 4 Officers of Survey and Construction branch of Pakistan Railways in "Bentley Rail Track" Software or equivalent through live instructor-led learning in-person in Internationally recognized Institute's classrooms in 2 batches. Consultant must arrange training program within 1 month of signing of agreement. The expenses for boarding and lodging will also be borne by the Consultant."

Clause No. 4. DELIVERABLES: Terms of Reference

12. Row at Serial No. 3

Row at Serial No. 3 is deleted and replaced with the following.

3.	*Bridge Analysis Report including individual report or chapter for each bridge analyzed in detail.*

13. Row at Serial No. 11

Row at Serial No. 11 is deleted and replaced with the following

11	*Train operation & Rolling Stock Report*

14. Row at Serial No. 14

Row at Serial No. 14 is deleted and replaced with the following.

14	*Report on study of yards and buildings*

Clause No. 5.2. Schedule of payments: Terms of Reference

15. Table for Submission of Deliverables is deleted and replaced with the following table.

S No.	***Submission of Deliverables (Payment will be done on acceptance of Deliverable)***	***%age Payment***
1.	*Inception Report*	*10(Ten) %*
2.	*Track condition survey report*	*5(Five) %*
3.	*Topographic Survey & Hydrology Study*	*10 (Ten) %*
4.	*Bridge Analysis Report*	*5 (Five) %*
5.	*Reports of study of up-gradation / conversion of Level Crossings, construction of boundary wall / fencing, provision / improvement of water supply and drainage*	*10 (Ten) %*

S No.	***Submission of Deliverables (Payment will be done on acceptance of Deliverable)***	***%age Payment***
	system, easement of sharp curves and Report on study of yards and buildings, Environmental Impact Assessment report. and Train operation & Rolling Stock Report (part payment for each study allowed on pro rata basis.)	
6.	*Reports for improvement of signalling and telecommunication system and Power supply study*	*5 (Five) %*
7.	*Report on study of assessment of Passenger and Freight Traffic*	*10 (Ten) %*
8.	*Financial and Economical Analysis Report*	*10 (Ten) %*
9.	*Cost Estimates*	*5 (Five) %*
10.	*Alignment Design Report with plan and profile of final alignment*	*5 (Five) %*
11.	*Draft Feasibility Report*	*10 (Ten) %*
12.	*Final Feasibility Report*	*15 (Fifteen) %*

CONSULTANCY SERVICES FOR

FEASIBILITY STUDY FOR UP-GRADATION / REHABILITATION OF EXISTING AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL – SHORKOT – CHAK JHUMRA – SANGLA HILL – WAZIRABAD (324 KM) & SHAHDARA BAGH – SANGLA HILL (90 KM) RAIL LINK

Minutes of Pre-Proposal Conference

A Pre-Proposal Conference was held in the office of the Chief Engineer/ Surveys & Constructions of Pakistan Railways Headquarter, Lahore on 10-04-2017 for subject feasibility study. Following were present:

A. Pakistan Railways (PR):

i) Deputy Chief Engineer / S&C

ii) AEN/S&C

B. Representatives of Firms:

i) JV. M/s Engineering Architecture Constructions (Pvt.) Ltd & 3TI PROGETTI S.p.A (Italy) (Mr. Malik Rahim).

ii) M/s China Design Group (Mr. M. Khurram Khan)

iii) M/s CREEC (Mr. Laeeq Zaidi)

iv) M/s Mirza Associates (Mr. Shahid Hussain)

v) Rehman Habib Consultant (Pvt.) Ltd (Mr. Zubair Ahmed, Abubakar)

vi) M/s P&DC (Pvt.) Ltd. (Mr. Umar Farooq)

vii) M/s NESPAK (Mr. S. Kumail, Mr. Atiq Chaudhry, Mr. Khalid, Mr. M. Khalid)

viii) M/s MMP (Mr. M. Mohsin, Mr. M. Irfan Gohar)

ix) M/s ILF (Mr. M. Aslam Anwar, Mr. Ch. Abdul Rehman, Mr. Qasim Umar)

C. Quarries and Comments

Sr.No	Queries	Reply/Comments
1.	1. The owner has provided the track information. Could the owner provide the relevant information of roadbed (such as:roadbed filling material, roadbed settlement, sub grade defect and other related contents)?	Client shall provide standard specification for road bed material but shall not provide roadbed settlement and sub grade defects.
2.	2. Could the owner provide the related information of road bed filler? (such as the location and quantity of borrow pit and spoil ground)	Geotechnical Investigation is deleted from TOR. Necessary Instructions has been issued through **Addendum No.1**
3.	3. In the DATA SHEET it mentioned that "time for completion of the assignment shall be Six Months (06) months after the mobilization period, excluding 15 days required by the Client for review and submission of comments on Draft Feasibility Report to the Consultants " Does the "15 days" include in the working period?	No, Fifteen days required by the Client for review and submission of comments on Draft Feasibility Study Report does not include in working period.
4.	4. (Working load/service load) of the current lines?	There Five (5) Trains running of subject section i.e. Five trains in up direction and Five trains in Down direction.
5.	5. What are the types of the current bridge piers and abutments? What is the bridge type of the current bridges? What is the main type of culverts of the current main line?	The information will be provided to successful Consultant. Necessary Instructions about Bridge condition survey has been issued through **Addendum No. 1.**
6.	What is the "Built in age" of the bridge? What is the "Axle Loading" (Working load/service load) of the current lines?	-do-
7.	What are the types of the current bridge piers and abutments? What is the bridge type of the current bridges? What is the main type of culverts of the current main line?	-do-
8.	In the RFP it said "Ruling Grade: Preferably 1:200 or as suggested by Consultant based on topography. " Could the owner indicate clearly and with certainly at the present stage?	Ruling Gradient steeper than 1:200 is not allowed however any grade easier than 1:200 can be suggested by Consultant.
9.	Q.6 (a) Pls confirm whether the consultant can propose a new ruling grade?	Yes, Consultant can propose new ruling gradient but not steeper than 1:200.
10.	Q.6 (b) Would the consultant finding be considered as first choice for implementation?	No, Consultant proposal will not necessary be considered as final

Sr.No	Queries	Reply/Comments
		choice for implementation. Clients deceision will be final Choice for implementation
11.	**Data sheet Para 2.29:** Keeping in view gigantic work involved the duration is too short. The period of study should be 15 months to ensure a sound & credible Feasibility Study.	The time duration is sufficient for subject assignment as per given scope because most of the field work, i.e. Geotechnical & Geological Investigation and Bridge Condition Survey, is deleted.
12.	**Section 1 Invation for RFP Para 7:** For such a large consultancy, the number of asociation/J.V members be allowed 4.	The Joint Venture comprising of three members is sufficient for subject assignment.
13.	**General:** The budget cost may please be indicated	No, Comments
14.	**Date sheet para 2.20.4:** It indicates weightage of technical and financial proposal as 80.20 qualifying marks have not been indicated.	Qualifying Marks have been given in **Addendum No. 1.**
15.	**Appendix II two data sheet item 1 (minmum qualification):** Minimum qualification for various positions has been indicated. For evaluation proposes, master degree will be awarded full marks. For each graduate degree, respective master degree may be specified indicating specialization. For example. i). For permanet way expert master in transporation engg or railway track engineering. ii). For railway alignment design expert, master degree in railway engineering.	Necessary Instruction has been issued through **Addendum No. 1**.
16.	**1. ITC Clause 2.1.14-Similar Assignment**	
	At the end of the existing definition please add the words "costing PKR 50 (fifty) Million or more", to bring it in conformity with the corresponding provision under appendix I to the Data sheet.	The said conformity is not required.
17.	**2. ITC Clause 2.15.2 – payment of consultancy and services fee**	
	According to the above quoted clause of the instructions to consultants: "15% Mobilization advance can be paid to the consultant against 100% counter bank guarantee from any scheduled bank of Pakistan. In case of any guarantee from foreign bank same must be counter-Guaranteed by any scheduled bank of Pakistan. Mobilization advance shall be	Clause 2.15.2 of Instruction to Consultant is deleted from RFP. Necessary Instruction has been issued though **Addendum No. 1.**

Sr.No	Queries	Reply/Comments
	recovered from interim payments on pro-rata basis". The above stated provision has however, not been included in the corresponding clause 5 of the TOR-Mode of payment. Since instruction to consultants does not form part of the contract documents, the above stated provision may also please be added under clause 5 of the TOR, as sub-clause 5.3-Mobilization advance.	
18.	**3. Appendix I to the data sheet-Details of evaluation Criteria-**	
	Item-iii of the Mandatory Requirements state as under:- iii). A Professional experts will not be considered for Evaluation if he has been already engaged in more than 1 ongoing Consultancy assignment The above text appears to be ambiguous. It may please be re-drafted as under:- "A professional expert will not be considered for evaluation if he is currently engaged in more than 1 (one) ongoing Consultancy assignment with Pakistan Railways"	The item – iii under heading Mandatory Requirements for Evaluation Criteria is clear. The word "ongoing Consultancy Assignment" means any Consultancy Assignment that is being carried out for any department of Pakistan or abroad. Hence there is no need for re-drafting the said Mandatory requirements.
19.	**4. Clause 3.4 of the TOR – Study of Up-Gradation/conversion of level crossings**	
	According to the existing text of clause 3.4 of the TOR "The consultant shall study all level crossings (at grade crossings) with a view to increase the safety of train and road users. The consultant shall prepare of comprehensive report about level crossings after taking into consideration visibility of level crossing from track and road, pervious accident history, interlocking arrangements, condition of road traffic based on an appropriate census in consultation with Client. Based on the analysis the consultant will also suggest (where required) provision of flyover or underpass and up-gradation of un-manned level crossings into manned level crossings besides shifting, to mitigate chronic problems of closure where above conditions of traffic data do not warrant further retention of level crossing." The collection of above referred road traffic data based on an appropriate census in consultation with the Client and subsequent	Parameter for Road traffic census is issued through **Addendum No. 1**

Sr.No	Queries	Reply/Comments
	analysis of such data, in respect of all the existing level crossings (the number can be more than 200), for the determination of their desired up-gradation/elimination, particularly for the proposed design speeds of 160 km/hr, shall be an exhaustive/elaborate exercise to make it meaningful. It is requested that parameters for carrying out the above stated road traffic census and analysis for the purpose of the proposed up-gradation/conversion of existing sections may be define in more detail, for the information of all prospective bidders.	
20.	**5. Clause 3.16 of the TOR-study for improvements /Establishment of maintenance facilities for Locomotives, carriage and Wagons**	
	The study of the existing train operation on the sections included in the feasibility study and recommended train operation for these sections after their proposed up-gradation is considered an important component of the feasibility study, but it is missing from the TOR. It is as such requested that the existing heading of this clause of the TOR may be revised as under to include the study of train operation as well in the assignment. **"Study of train operation and improvement / up-gradation of the existing facilities for the Maintenance of Rolling Stock"**	The heading of Clause no. 3.16 is revised through **Addendum No.1**
21.	In the above context, the following may be added in the beginning of the existing text of clause 3.16. "Based on the future traffic demand determined under clause 3.8 of the TOR, the consultants shall develop train operation plans for all the sections included in the feasibility study, keeping in view the tractive effort, horse power, operating schedules, journey times and turn rounds etc. of the proposed locomotives and rolling stock both for the projected passenger and freight trains."	The required text is added in Clause No. 3.16 of TOR through **Addendum No. 1.**
22.	**6. Clause 3.7.4 of the TOR – plan and profile of the entire corridor**	
	As per above stated clause 3.7.4 (viii) and (ix) of the TOR, the cross sections of Railway embankment and profile shall be run at not	Horizantal Scale mentioned in Clause No. 3.7.4 is revised. Necessary

Sr.No	Queries	Reply/Comments
	more than 200 meters intervals and the Consultants shall prepare longitudinal profile at centre of the existing track and the centre of new alignment (where applicable) to be plotted on 1/1000 horizontal and 1/100 vertical scale. It was noticed by us during the plotting the above referred longitude profile on earlier projects that at the horizontal scale of 1/1000 only one cross section for profile leveling could be accommodated in one A3 sheet, and thus proper / meaningful longitudinal profile could not be drawn. In the circumstances, to ensure the plotting of a meaningful longitudinal profile the horizontal scale had to be reduced to 1/2500 so that at least three longitudinal profile readings at intervals of 200m could be accommodated on one A3 sheet. The existing sub-clause 3.7.4 (ix) of the TOR may accordingly be replaced as under: ix). consultants shall also prepare longitudinal profile at the centre of the existing track and centre of new alignment (where applicable) to be plotted on 1/2500 horizontal and 1/100 vertical scale.	instructions has been issued through **Addendum No.1.**
23.	**7.** Clause 3.2 of the TOR : bridge condition survey and rehabilitation / extension / reconstructions of bridges) Scope of work given in the above stated clause of the TOR does not clearly indicate if the structural analysis of the super structure of the existing steel girder bridges is also part of structural and analysis of selected bridges. In case the existing steel girders are to be analyzed, the present scope needs elaboration, because these girders have been manufactured / fabricated / strengthened by Pakistan Railways from the structural steel sections procured by them according to their own specifications and is based on steel bridge code, which is presumably more than 70 years old. On the contrary most of the available international codes of practice and the software used for analysis of steel girders / trusses are based on new researches on the design of steel structures and different standard steel sections.	Necessary Instructions has been issued through **Addendum No.1.**
24.	**8. Clause 3.2.2.3 of the TOR (Non – Destructive Testing NDT)**	

Sr.No	Queries	Reply/Comments
	As per clause 3.2.2.3 of the TOR, the existing bridges on the section have been divided into following four groups for the selection of representative bridges for detailed testing. i) Concrete slab/girder bridges ii) Steel girder / truss bridges iii) Masonry arch bridges iv) RCC/Hume Pipe culverts It has been noticed that non-destructive tests have only specified for the bridges falling under sub-items i), iii) above. No such test has been specified for pipe culverts as a policy. Please elaborate if no NDT is to be performed for RCC culverts.	Non destructive testing is deleted from TOR. Necessary Instructions has been issued through **Addendum No.1.**
25.	**9. Clause 3.9.1 of the TOR-Data collection and Desk Study under Geotechnical Investigations**	
	It has been specified that the consultant have to collected satellite images but quality / resolutions of satellite images have not been specified. Based on our experience in earlier projects, high resolutions satellite images (0.6m) may be procured.	Geotechnical Investigation is deleted from TOR. Necessary Instructions is issued through Addendum No. 1
26.	A similar clarification may be made for the topographic survey under clause 3.7 of the TOR as such satellite images will be necessary for the plotting of plan and profile of the designed alignment referred to under item 10 below.	Necessary Instructions has been issued through **Addendum No. 1.**
27.	**10. Clause 3.14 of the TOR-study of buildings**	
	This item is not insulated in the list of deliverable and the schedule of payment. it may be merged with the study of yards for the purpose of deliverables and for schedule of payment.	The report for study of Buildings and Yard are merged. Necessary Instructions has been issued through **Addendum No. 1.**
28.	**11. Alignment design report with plan and profile of final alignment**	

Sr.No	Queries	Reply/Comments
	Scope of work for "Alignment design report plan and profile of final alignment" has not been included in the TOR, although it is included in the list of deliverables under TOR. It was also part of the TOR for the pervious feasibility studies as given below: The consultant shall modify existing alignment, after incorporating all the proposed up-gradation/improvement works like easement of curves, relaxation of grades, raising of track/embankment level etc. and submit final track alignment (plan and profile) of entire route. In the above context it is recommended that alignment design parameters should be specified i.e. what guidelines/parameters are to be followed for the design of new/revised alignment (e.g. AREMA or German Railway or Pakistan Railways of Indian Railways). Scope of work must include use of internationally recognized rail alignment design software "ProVI module Rail" or equivalent.	The scope of work for *"Alignment Design Report with plan and profile of final alignment"* is mentioned in sub clause No. (v) of Clause No. 3 of TOR. Guidelines / parameters of Pakistan Railways / AREMA are to be followed for easement of sharp curves and grades. The revised alignment after easement of sharp curves and grades should be designed on "Bentley Rail Track" software or equivalent. Necessary Instructions has been issued through **Addendum No. 1.**
29.	**12. Clause 5.2 of the TOR-schedule of payments.**	
	It has been observed that the schedule of payments given under sub-clause 5.2 of the TOR, is not very realistic in some cases and thus need to be reviewed as stated below along with insertion of new clause 5.3 in the TOR for 15% mobilization advance, as recommended under item 2 above.	Clause No. 5.2 is revised. Necessary Instructions are issued through **Addendum No. 1.**
30.	**13. Clause 4.0 of the TOR-Deliverables**	

Sr.No	Queries	Reply/Comments
	i) The existing number of deliverables appears to be too large and thus un-manageable. ii) Report of "Train operation and rolling stock" indicated in the TOR and in para 5.2 for payment does not appear in Clause 4 i-e Deliverables. This report may be added in the list of deliverables under Clause 4 of the TOR. iii) The following deliverables included clause 4 of TOR may be considered for merging to reduce the number of the deliverables. a) Reports on Easement of sharp curves and Gradients and design od alignment b) Study of improvement / conversion of level crossing and provision os fencing / boundary walls. c) Study of yards, study of buildings and water supply / drainage at stations	Necessary Instructions are issued through **Addendum No. 1.**

PAKISTAN RAILWAYS

Headquarters Office, Lahore

REQUEST FOR PROPOSAL (RFP)

FOR

APPOINTMENT OF

NATIONAL/INTERNATIONAL CONSULTANTS

FEASIBILITY STUDY IN CONNECTION WITH UP-GRADATION/REHABILITATION OF EXISTING LINE AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL-SHORKOT-CHAK JHUMRA-SANGLA HILL-WAZIRABAD (324 KMS) & SHAHDARA BAGH -SANGLA HILL (90 KMS) RAIL LINK

Pakistan Railways intends to hire the services of National/International Consultants or consortium of Consultants, for carrying out Feasibility Study In Connection With Up-Gradation/Rehabilitation Of Existing Line And Construction Of Additional Line (Doubling) On Khanewal-Shorkot-Chak Jhumra-Sangla Hill-Wazirabad (324 Kms) & Shahdara Bagh -Sangla Hill (90 Kms) Rail Link.

The interested firms can download RFP documents from Pakistan Railways websit23e **(wwe.Pakrail.com)** or PPRA website **(www.ppra.org.pk)** consisting of TOR, consultant's evaluation criteria and format of Technical & Financial proposals for this project.

Interested National/International leading Consulting firms or Joint Ventures having international experience of carrying out Feasibility Studies particularly in Railway Sector are invited to participate for the bidding of this project.

Technical and financial proposals shall be submitted in TWO separate envelopes.

A pre-proposal conference shall be held on 10 April, 2017 at Railway Headquarter office Lahore in which prospective Consultants are requested to attend. Any further information can be obtained from the under signed during office hours.

The prospective bidders will submit their proposals only on prescribed format, at the following address on or before **05 May, 2017** up to **2:00 pm.** Technical proposals will be opened on the same date and venue at **2:30 pm** in the presence of representative of firms, who choose to witness.

Tender No. 844-W/450 (S&C) Tender

ALI MUHAMMAD AFRIDI
Chief Engineer (Survey & Construction)
Pakistan Railways, Headquarters Office,
Empress Road, Lahore.
Ph.(042) 99201625, Fax (042) 99201760
Email: censc@pakrail.com Web: www.Pakrail.com

PAKISTAN RAILWAYS

REQUEST FOR PROPOSAL (RFP)

FOR

FEASIBILITY STUDY IN CONNECTION WITH UP-GRADATION/REHABILITATION OF EXISTING LINE AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL-SHORKOT-CHAK JHUMRA-SANGLA HILL-WAZIRABAD (324 KMS)

&

SHAHDARA BAGH -SANGLA HILL (90 KMS) RAIL LINK

MARCH, 2017

Chief Engineer / Survey & Construction
Headquarters Office
Lahore Pakistan.
PH: +92-42-9201625 FAX: +92-42-9201760

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Section 1: Invitation for RFP

No. W-_____ Date: February____, 2017.

SUBJECT: **INVITATION FOR RFP (REQUEST FOR PROPOSAL) FOR SELECTION OF CONSULTANTS FOR FEASIBILITY STUDY IN CONNECTION WITH UP-GRADATION/REHABILITATION OF EXISTING LINE AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL-SHORKOT-CHAK JHUMRA-SANGLA HILL-WAZIRABAD (324 KMS) & SHAHDARA BAGH -SANGLA TO HILL (90 KMS) RAIL LINK.**

1. The Chief Engineer/Survey & Construction (S&C) invites Technical and Financial proposals to provide the following consultancy services:
   Feasibility study in connection with up-gradation/Rehabilitation of existing line and construction of additional line (Doubling) on Khanewal-Shorkot-Chak Jhumra-Sangla Hill-Wazirabad (324 Kms) & Shahdara Bagh to Sangla Hill (90 Kms) Rail Link.
2. Consultants will be selected under Quality and Cost Based Selection (QCBS) method as described in this RFP in accordance with PPRA Rule 2004 and PPRA Procurement of Consultancy Services Regulations 2010.
3. The RFP includes the following documents:

   Section 1: General Information
   Section 2: Instructions to Consultants (including Data Sheet)
   Section 3: Technical Proposal – Standard Forms
   Section 4: Financial Proposal – Standard Forms
   Section 5: Terms of Reference

4. It is mandatory for proposals to be prepared using Standard Forms of RFP. Any proposal not prepared according to prescribed format may be rejected. If any information required in the Forms is found missing or written elsewhere, no credit will be given in the relevant section of the evaluation.
5. The Consultants / Firms should submit details of **Five (5)** of their most relevant assignments of similar projects for technical evaluation using the prescribed format. Assignments given beyond the required number will not be considered.
6. CVs of key personnel corresponding to the list given in Data Sheet should provide details of **Five (5)** projects done by each individual in the past.
7. The Consultant can be single entity or Joint Venture / consortium of International and national firms, with total number of firms in JV not more than three.
8. The Technical and Financial proposals are to be submitted in separate sealed envelopes at the following address not later than**_____, 2017 till 2:00 pm.**

(Ali Muhammad Afridi)
Chief Engineer / S&C
Pakistan Railways, Headquarter Office
Lahore.
042 – 99201625
Email: censc@pakrail.com

General Information

The Consultants are required to provide following information which is necessary for further processing of the proposals:

1. Whether applied as Single Entity or Joint Venture, please specify.

2. In case of Joint Venture provide the following information along with attached Form **General-1** for all JV partners.

S.No.	**Name of JV partners**	**% share proposed for this assignment**
1.	Lead Partner	
2.	Partner No.1	
3.	Partner No.2	

3. The Consultants are required to provide accurate information on any litigation or arbitration, arising out of the assignments completed or in progress over the last five years in the manner as prescribed in the Form **General-2**
4. Certificate / affidavit that the Firm is not blacklisted by any government department / authority.
5. For local firms National Income Tax number (NTN) of Pakistan and for foreign firms Tax Registration Number of parent country, in case of JV please provide this information for all partners.(please attach copies of valid registration)
6. For local firms Registration with Pakistan Engineering Council (PEC) and for foreign firms relevant registration with relevant engineering bodies of parent country. (please attach copies of valid registration)
7. Last three years audited reports of accounts of the firm.
8. Power of attorney to sign the proposals.
9. Joint Venture agreement in case of JV.

Form General-1 – <u>Basic Information</u>

1. Name of Firm.
2. Office address in Pakistan.
3. Office address overseas (if applicable).
4. Organization Chart.
5. Telephone & Fax
6. e-mail
7. Contact person
8. Place of incorporation / registration
9. Year of incorporation / registration
10. Country of origin (if other than Pakistan)
11. Type of organization (whether partnership / sole proprietorship / public limited company / private limited company (Attach copy of Memorandum of Article, Memorandum of Association and registration certificate with Security Exchange Commission or Registrar of Firm)

Note: In case of JV above information should be provided for all partners.

Form General-2 - Litigation History

Consultants, including each of the partners of a joint venture, should provide information on any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution. A separate sheet should be used for each partner of joint venture.

Party / Parties of the claim / dispute	Nature of Claim / Dispute	Amount of the claim / dispute.	Date initiated	Status (Award **FOR** or **AGAINST** Consultant)

Section 2: Instructions to Consultants

2.1. Definitions

2.1.1. “Government Of Pakistan” Means The Government Of Pakistan And All Its Associated Departments, Agencies, Autonomous/Semi-Autonomous Bodies, Boards, Universities And Similar Other Organizations.

2.1.2. “Client” means Chief Engineer / S&C, Pakistan Railways, Headquarter Office, Lahore.

2.1.3. “Consultants” means any entity / firm / Joint venture of firms that may provide the Services to the Client under the Agreement. The Consultant can be single entity or Joint Venture / consortium of International and national firms, with total number of firms in JV not more than three.

2.1.4. “Agreement” means the Agreement signed by the Client and the Consultants and all the attached documents.

2.1.5. “Data Sheet” means such part of the Instructions to Consultants used to reflect specific conditions.

2.1.6. “Day” means calendar day.

2.1.7. “Instructions to Consultants” means the document which provides Consultants with all information needed to prepare their Proposals.

2.1.8. “Personnel” means professionals and support staff provided by the Consultant or by any Sub-Consultant to perform the Services or any part thereof; “Foreign Personnel” means such professionals and support staff who at the time of being so provided had their domicile outside Pakistan; ’Local Personnel” means such professionals and support staff who at the time of being so provided had their domicile inside Pakistan.

2.1.9. “Proposal” means the Technical Proposal and the Financial Proposal.

2.1.10. “RFP” means the Request for Proposal issued by the Client for the selection of Consultants.

2.1.11. “Services” means the work to be performed by the Consultants pursuant to the Agreement.

2.1.12. “Sub-Consultant” means any person or entity with whom the Consultants enter into sub-agreement(s) for any part of the Services.

2.1.13. “Terms of Reference” (TOR) means the document included in the RFP which explains the objectives, scope of work, activities, tasks to be performed, respective responsibilities of the Client and the Consultant, and expected results and deliverables of the assignment.

2.1.14. “Similar Assignment” means Feasibility Study for establishing new route(s) for railway track or feasibility study for up-gradation / improvement of existing railway track

2.2. Introduction

2.2.1. The Consultants are invited to submit a Technical Proposal and a Financial Proposal for consulting services required for the assignment named in the Data Sheet. The proposals should be in separate marked and sealed envelopes. The Proposal will be the basis for agreement negotiations and ultimately for a signed Agreement with the selected Consultants.

2.2.2. Consultants should familiarize themselves with assignment conditions and take them into account in preparing their Proposals. To obtain first-hand information on the assignment, Consultants are encouraged to visit the Client before submitting a proposal and to attend a pre-proposal conference as per schedule specified in Data Sheet.

2.2.3. Consultants should contact the Client’s representative named in the Data Sheet to obtain information regarding the assignment. Consultants should ensure that the concerned official is informed well-ahead of time in case they wish to visit the Client.

2.2.4. Consultants shall bear all costs associated with the preparation and submission of their proposals and agreement negotiation. The Client is not bound to accept any proposal, and reserves the right to annul the selection process at any time prior to Agreement award, without thereby incurring any liability to the Consultants.

2.3. Conflict of Interest

2.3.1. The policy of Government of Pakistan requires that Consultants provide professional, objective, and impartial advice and at all times hold the Client’s interests paramount, strictly avoid conflicts with other assignments or their own corporate interests and act without any consideration for future work.

2.3.2. Without limitation on the generality of the foregoing, Consultants, and any of their affiliates, shall be considered to have a conflict of interest and shall not be recruited, under any of the circumstances set forth below:

2.4. Conflicting Activities

2.4.1. A firm that has been engaged by the Client to provide goods, works or services other than consulting services for a project, and any of its affiliates, shall be disqualified from providing consulting services related to those goods, works or services. Conversely, a firm hired to provide consulting services for the preparation or implementation of a project, and any of its affiliates, shall be disqualified from subsequently providing goods or works or services other than consulting services resulting from or directly related to the firm's consulting services for such preparation or implementation. For the purpose of this paragraph, services other than consulting services are defined as those leading to a measurable physical output, for example surveys, exploratory drilling, aerial photography, and satellite imagery etc.

2.5. Conflicting Assignments

2.5.1. A Consultant (including its Personnel and Sub- Consultants) or any of its affiliates shall not be hired for any assignment that, by its nature, may be in conflict with another assignment of the Consultant to be executed for the same or for another Client. For example, a Consultant hired to prepare engineering design for an infrastructure project shall not be engaged to prepare an independent environmental assessment for the same project, and a Consultant assisting a Client in the privatization of public assets shall neither purchase, nor advise purchasers of, such assets. Similarly, a Consultant hired to prepare Terms of Reference for an assignment should not be hired for the assignment in question.

2.6. Conflicting Relationships

2.6.1. A Consultant (including its Personnel and Sub- Consultants) that has a business or family relationship with a member of the Client's staff who is directly or indirectly involved in any part of (i) the preparation of the Terms of Reference of the assignment, (ii) the selection process for such assignment, or (iii) supervision of the Agreement, may not be awarded an Agreement, unless the conflict stemming from this relationship has been resolved in a manner acceptable to the Pakistan Railways throughout the selection process and the execution of the Agreement.

2.6.2. Consultants have an obligation to disclose any situation of actual or potential conflict that impacts their capacity to serve the best interest of their Client, or that may reasonably be perceived as having this effect. Failure to disclose said situations may lead to the disqualification of the Consultant or the termination of its Agreement.

2.6.3. No agency (except any subsidiary of the Client) or current employees of the Client shall work as Consultants under their own ministries, departments or agencies. Recruiting former government employees of the Client to work for their former ministries, departments or agencies is acceptable provided no conflict of interest exists. When the Consultant nominates any government employee as Personnel in their technical proposal, such Personnel must have written certification from their government or employer confirming that they are on leave without pay from their official position and allowed to work full-time outside of their previous official position. Such certification shall be provided to the Client by the Consultant as part of his technical proposal.

2.7. Unfair Advantage

2.7.1. If a Consultant could derive a competitive advantage from having provided consulting services related to the assignment in question, the Client shall make available to all applicants together with this RFP all information that would in that respect give such Consultant any competitive advantage over competing Consultants.

2.8. Fraud and Corruption

2.8.1. Pakistan Railways requires Consultants participating in its projects to adhere to the highest ethical standards, both during the selection process and throughout the execution of an agreement. In pursuance of this policy, Pakistan Railways:

a) Defines, for the purpose of this paragraph, the terms set forth below as follows:

(i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the selection process or in agreement execution;

(ii) "fraudulent practice" means a misrepresentation or omission of facts in order to influence a selection process or the execution of an agreement;

(iii) "collusive practices" means a scheme or arrangement between two or more consultants with or without the knowledge of the Client, designed to establish prices at artificial, noncompetitive levels;

(iv) "Coercive practices" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in procurement process, or affect the execution of agreement.

b) will reject a proposal for award if it determines that the Consultant recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the agreement in question;

c) will penalize a Consultant, including declaring the Consultant ineligible, either indefinitely or for a stated period of time, to be awarded a Government of Pakistan agreement if at any time it determines that the Consultant has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for, or in executing, a Government of Pakistan agreement; and

d) will have the right to require that a provision be included requiring Consultants to permit the Government of Pakistan to inspect their accounts and records and other documents relating to the submission of proposals and agreement performance, and have them audited by auditors appointed by the Government of Pakistan.

e) Consultants, their Sub-Consultants, and their associates shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Pakistan.

2.9. Only one Proposal

2.9.1. Each Consultants / JV can submit only one proposal. If a Consultant submits or participates in more than one proposal, all such proposals, in which the Consultants have participated, shall be disqualified.

2.10. Proposal Validity

2.10.1. The Data Sheet indicates how long Consultants' Proposals must remain valid after the submission date. During this period, Consultants shall maintain the availability of Professional staff nominated in the Proposal. The Client will make its best effort to complete negotiations within this period. Should the need arise, however, the Client may request Consultants to extend the validity period of their proposals. Consultants who agree to such extension shall confirm that they maintain the availability of the Professional staff nominated in the Proposal, or in their confirmation of extension of validity of the Proposal, Consultants could submit new staff in replacement, who would be considered in the final evaluation for agreement award. Consultants who do not agree, have the right to refuse to extend the validity of their Proposals.

2.11. Clarification and Amendment of RFP Documents

2.11.1. Consultants may request a clarification of any of the RFP documents up to the number of days indicated in the Data Sheet before the proposal submission date. Any request for clarification must be sent in

writing, or by standard electronic means to the Client's address indicated in the Data Sheet. The Client will respond in writing, or by standard electronic means and will send written copies of the response (including an explanation of the query but without identifying the source of inquiry) to all Consultants. Should the Client deem it necessary to amend the RFP as a result of a clarification, it shall do so following the procedure as stated in para below.

2.11.2. At any time before the submission of Proposals, the Client may amend the RFP by issuing an addendum in writing or by standard electronic means. The addendum shall be sent to all Consultants and will be binding on them. Consultants shall acknowledge receipt of all amendments. To give Consultants reasonable time in which to take an amendment into account in their Proposals the Client may, if the amendment is substantial, extend the deadline for the submission of Proposals.

2.12. Preparation of Proposal

2.12.1. The Proposal, as well as all related correspondence exchanged by the Consultants and the Client, shall be written in the language (s) specified in the Data Sheet.

2.12.2. In preparing their Proposal, Consultants are expected to examine in detail the documents comprising the RFP. Material deficiencies in providing the information requested may result in rejection of a Proposal.

2.13. Technical Proposal Format and Content

2.13.1. The Technical Proposal shall provide the information indicated in the following paras from (a) to (g) using the attached Standard Forms (Section 3).

a) A brief description of the Consultants' organization and an outline of recent experience of the Consultants (each partner in case of joint venture) on assignments of a similar nature are required in Form TECH-2 of Section 3. For each assignment, the outline should indicate the names of Sub-Consultants/ Professional staff who participated, duration of the assignment, agreement amount, and Consultant's involvement. Information should be provided only for those assignments for which the Consultant was legally engaged by the Client as a firm or as one of the major firms within a joint venture. Assignments completed by individual Professional staff working privately or through other consulting firms cannot be claimed as the experience of the Consultant, or that of the Consultant's associates, but can be claimed by the Professional staff themselves in their CVs. Consultants should be prepared to substantiate the claimed experience if so requested by

the Client.

b) Comments and suggestions on the Terms of Reference including workable suggestions that could improve the quality/ effectiveness of the assignment; (Form TECH-3 of Section 3).

c) A description of the approach, methodology and work plan for performing the assignment covering the following subjects: technical approach and methodology, work plan, and organization and staffing schedule. Guidance on the content of this section of the Technical Proposals is provided under Form TECH-4 of Section 3.

d) The list of the proposed Professional staff team by area of expertise, the position that would be assigned to each staff team member, and their tasks (Form TECH-5 of Section 3).

e) CVs of the Professional staff signed by the staff themselves or by the authorized representative of the Professional Staff (Form TECH-6 of Section 3) along with their Computerized National Identity Card numbers (if local) or Passport numbers (if foreigner).

f) Estimates of the staff input needed to carry out the assignment (Form TECH-7 of Section 3). The staff- months input should be indicated separately for home office and field activities.

g) Annual Turnover (Form TECH-8 of Section 3). The annual turnover should be indicated separately for last three years.

2.13.2. The Technical Proposal shall not include any financial information. A Technical Proposal containing financial information may be declared non responsive.

2.14. Financial Proposal

2.14.1. The Financial Proposal shall be prepared using the attached Standard Forms (Section 4). It shall list all costs associated with the assignment.

2.15. Payment of Consultancy & Services Fee

2.15.1. The amount of remuneration will be claimed / paid as per the relevant clause of section-5 TOR.

2.15.2. 15% Mobilization Advance can be paid to the Consultant against 100% counter bank guarantee from any scheduled bank of Pakistan. In case of any guarantee from foreign bank same must be counter

guaranteed by any scheduled bank of Pakistan. Mobilization Advance shall be recovered from interim payments on pro-rata basis.

2.15.3. 5% Retention Money will be deducted from each interim/monthly payment. Retention Money will be returned after six months of completion of the assignment.

2.15.4. The Client shall make all payments to the Consultant in Pak Rupees. However, the Client shall have no objection and shall facilitate the remittance in foreign currency of the remuneration of the foreign partner to the extent of services rendered by it with regard to this consultancy assignment.

2.16. Taxes

2.16.1. The Consultant may be subject to local taxes on amounts payable by the Client under the Agreement. The Client will state in the Data Sheet if the Consultant is subject to payment of any taxes. Payment of all taxes shall be the responsibility of the consultant.

2.17. Submission, Receipt and Opening of Proposal

2.17.1. The original proposal (Technical Proposal and Financial Proposal) shall contain no interlineations or overwriting, except as necessary to correct errors made by the Consultants themselves. The person who signed the proposal must initial such corrections. Submission letters for both Technical and Financial Proposals should respectively be in the format of TECH-1 of Section 3, and FIN-1 of Section 4.

2.17.2. An authorized representative of the Consultants shall initial all pages of the original Technical and Financial Proposals. The authorization shall be in the form of a written power of attorney accompanying the Proposal or in any other form demonstrating that the representative has been duly authorized to sign. The signed Technical and Financial Proposals shall be marked “ORIGINAL”.

2.17.3. The Technical Proposal shall be marked “ORIGINAL” or “COPY” as appropriate. The Technical Proposals shall be sent to the addresses referred to in Data Sheet against Paragraph Reference 2.2.1 and in the number of copies indicated in the Data Sheet. All required copies of the Technical Proposal are to be made from the original. If there are discrepancies between the original and the copies of the Technical Proposal, the original governs.

2.17.4. The original and all copies of the Technical Proposal shall be placed in a sealed envelope clearly marked “TECHNICAL PROPOSAL” Similarly, the original Financial Proposal shall be placed in a sealed envelope clearly marked “FINANCIAL PROPOSAL” followed by the

name of the assignment, and with a warning “DO NOT OPEN WITH THE TECHNICAL PROPOSAL.” The envelopes containing the Technical and Financial Proposals shall be placed into an outer envelope and sealed. This outer envelope shall bear the submission address and title of the Assignment, clearly marked “DO NOT OPEN, EXCEPT IN PRESENCE OF THE OFFICIAL APPOINTED, BEFORE SUBMISSION DEADLINE”. The Client shall not be responsible for misplacement, losing or premature opening if the outer envelope is not sealed and/or marked as stipulated. This circumstance may be case for Proposal rejection. If the Financial Proposal is not submitted in a separate sealed envelope duly marked as indicated above, this will constitute grounds for declaring the Proposal non-responsive.

2.17.5. The Proposals must be sent to the address/addresses indicated in the Data Sheet and received by the Client not later than the time and the date indicated in the Data Sheet, or any extension granted thereof. Any proposal received by the Client after the deadline for submission shall be returned unopened.

2.17.6. The Client shall open the Technical Proposal immediately after the deadline for their submission. The envelopes with the Financial Proposal shall remain sealed and securely stored.

2.18. Proposal Evaluation

2.18.1. From the time the Proposals are opened to the time the Agreement is awarded, the Consultants should not contact the Client on any matter related to its Technical and/or Financial Proposal. Any effort by Consultants to influence the Client in the examination, evaluation, ranking of Proposals, and recommendation for award of Agreement may result in the rejection of the Consultants’ Proposal. Evaluators of Technical Proposals shall have no access to the Financial Proposals until the technical evaluation is concluded.

2.19. Evaluation of Technical Proposal

2.19.1. The evaluation committee shall evaluate the Technical Proposals on the basis of their responsiveness to the Terms of Reference, applying the evaluation criteria, sub-criteria, and point system specified in Evaluation Criteria in Data Sheet and Appendix-I to Data Sheet and each responsive Proposal will be given a technical score. A Proposal shall be rejected at this stage if it does not respond to important aspects of the RFP, and particularly the Terms of Reference or if it fails to achieve the minimum technical score indicated in the Evaluation Criteria.

2.20. Public Opening and Evaluation of Financial Proposals

2.20.1. After the technical evaluation is complete the Client shall notify in writing to the three top ranking Consultants that have secured the minimum qualifying marks, the date, time and location for opening the Financial Proposals. Consultants' attendance at the opening of Financial Proposals is optional. The opening date shall be set so as to allow interested Consultants sufficient time to make arrangements for attending the opening.

2.20.2. Financial Proposals shall be opened publicly in the presence of the Consultants' representatives who choose to attend. The name of the Consultants and the technical scores of the Consultants shall be read aloud. The Financial Proposal of the three top ranking Consultants who met the minimum qualifying mark will then be inspected to confirm that they have remained sealed and unopened. These Financial Proposals shall be then opened, and the total prices read aloud and recorded.

2.20.3. 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. The Evaluation Committee shall correct the quantification indicated in the Financial Proposal so as to make it consistent with that indicated in the Technical Proposal, apply the relevant unit price included in the Financial Proposal to the corrected quantity and correct the total Proposal cost.

2.20.4. The weightage of Technical and Financial Proposals would be as indicated in Data Sheet.

2.21. Technical Negotiations

2.21.1. Technical Negotiations will be held at the address indicated in the Data Sheet. The invited Consultant will, as a pre-requisite for attendance at the negotiations, confirm availability of all Professional staff. Failure in satisfying such requirements may result in the Client proceeding to negotiate with the next- ranked Consultant.

2.21.2. Representatives conducting negotiations on behalf of the Consultant must have written authority to negotiate and conclude an Agreement.

2.21.3. Technical negotiations will include a discussion of the Technical Proposal, the proposed technical approach and methodology, work plan, and organization and staffing, and any suggestions made by the Consultant to improve the Terms of Reference. The Client and the Consultants will finalize the Terms of Reference, staffing schedule, work schedule, logistics, and reporting. These documents will then be incorporated in the Agreement as "Description of Services". Special

attention will be paid to clearly defining the inputs and facilities required from the Client to ensure satisfactory implementation of the assignment. The Client shall prepare minutes of negotiations which will be signed by the Client and the Consultant.

2.22. Availability of Professional Staff / Experts

2.22.1. Having selected the Consultant on the basis of, among other things, an evaluation of proposed Professional staff, the Client expects to negotiate an Agreement on the basis of the Professional staff named in the Proposal. Before agreement negotiations, the Client will require assurances that the Professional staff will be actually available. The Client will not consider substitutions during agreement negotiations unless both parties agree that undue delay in the selection process makes such substitution unavoidable or for reasons such as death or medical incapacity. If this is not the case and if it is established that Professional staff were offered in the proposal without confirming their availability, the Consultant may be disqualified. Any proposed substitute shall have equivalent or better qualifications and experience than the original candidate and be submitted by the Consultant within the period of time specified in the letter of invitation to negotiate.

2.23. Conclusion of the Negotiations

2.23.1. Negotiations will conclude with a review of the draft Agreement. To complete negotiations the Client and the Consultant will initial the agreed Agreement. If negotiations fail, the Client will invite the Consultant whose Proposal received the second highest score to negotiate an Agreement.

2.24. Award of Agreement

2.24.1. After completing negotiations the Client shall award the Agreement to the selected Consultant and publish details on the website. The agreement will be executed based on Standard Format of Pakistan Engineering Council (PEC) for large projects (Lump Sum Based).

2.25. Confidentiality

2.25.1. Information relating to evaluation of Proposals and recommendations concerning awards shall not be disclosed to the Consultants who submitted the Proposals or to other persons not officially concerned with the process, until the publication of the award of Agreement. The undue use by any Consultant of confidential information related to the process may result in the rejection of its Proposal and may be subject to the provisions of the Consultant Selection Guidelines relating to fraud and corruption.

2.26. Integrity Pact

2.26.1. The successful Bidder shall sign and stamp the Integrity Pact, as per Standard Format of Pakistan Engineering Council (PEC), in case contract value exceeds Pak Rs. 10.000 Million.

2.27. Registration of Foreign Firms with Pakistan Engineering Council (PEC)

2.27.1. The successful Bidder shall be required to abide by the bylaws of Pakistan Engineering Council (PEC) and in case of foreign firm they are required to get registered with PEC after signing of the Contract Agreement.

2.28. Bankable Feasibility Study

2.28.1. The Feasibility Study should be of international standard, acceptable to national / international financial institutions.

2.29. Time for Completion

2.29.1. Time for completion of the assignment shall be as specified in the Data Sheet.

2.29.2. Mobilization Period, after signing of agreement shall be as specified in the Data Sheet.

Instructions to Consultants

DATA SHEET

Paragraph Reference	
	Name of the Client: Chief Engineer / Survey & Construction, Pakistan Railways, Headquarter Office, Lahore, Pakistan. Method of selection: QCBS (Quality and cost based Selection) in accordance with PPRA Rule 2004 and PPRA Procurement of Consultancy Services Regulations 2010.
2.2.2	Name of the assignment is: Feasibility study in connection with up-gradation/Rehabilitation of existing line and construction of additional line (Doubling) on Khanewal-Shorkot-Chak Jhumra-Sangla Hill-Wazirabad (324 Kms) & Shahdara Bagh to Sangla Hill (90 Kms) Rail Link. Financial Proposal to be submitted together with Technical Proposal, however, both should be in separate sealed envelope clearly marked with name of Assignment and Firm.
2.2.3	**Pre-proposal conference shall be held as per following schedule:** First Pre-proposal conference: Date: **10th April, 2017.** Time: **12:00 pm** at Conference Room. No.1, Pakistan Railways, Headquarters Office, Empress Road, Lahore
2.2.4	Rizwan Hashmi Deputy Chief Engineer / S&C, Pakistan Railways, Headquarter Office, Lahore, Pakistan. Phone: +92 42 99201797, 99201625 E-mail: censc@pakrail.com
2.10.1	Proposals must remain valid for ninety (90) days after the submissio date
2.11.1	Clarifications may be requested not later than seven (7) days before th submission date.

2.12.1	Proposals shall be submitted in the following language: English.
2.16.1	Withholding / Advance Income Tax will be deducted as per prevailing government rules. It will be exclusive Consultant's responsibility to include all applicable Federal, Provincial or City taxes / fees & levies in the Financial Proposal
2.17.3	Consultant must submit one original and two (2) copies of the Technical Proposal and the original of the Financial Proposal.
2.17.5	The Proposal submission address is: The Chief Engineer / S&C, Pakistan Railways, Headquarter Office, Empress Road, Lahore, Pakistan Proposals must be submitted not later than the following date and time: **On or before 5th May ,2017 not later than 2:00 pm**

2.19.1	Criteria, sub-criteria, and point system for the evaluation of Technical Proposals are: (i) **Company Profile:** 40% (ii) **Project Team:** 40% (iii) **Approach & Methodology:** 20% Description — Points (i) **Company Profile:** **[*100*]** a) Number of similar assignments [40] b) Value of similar assignments [40] c) Organizational structure [10] d) Financial Capability [10] Total = A_1 (ii) **Project Team:** **[100]** 1. Project Manager (Permanent way Expert) [10] 2. Railway Expert / Bridges & Structures [8] 3. Railway Alignment Design Expert [8] 4. Railway Expert / Train Operation [7] 5. Railway Expert / Signalling & Telecom [7] 6. Railway Expert / Electrical [7] 7. Railway Expert / Mechanical [7] 8. Transport Economist & Financial Specialist [8] 9. Environmental & Social Expert [5] 10. Transportation Expert [5] 11. Geologist [5] 12. Geo-Tech Expert [5] 13. Hydrology Expert [6] 14. Topographic Survey Expert [6] 15. GIS Expert [6] Total = A_2 (iii) **Approach & Methodology:** **[*100*]** a) Understanding & Innovativeness [*40*] b) Methodology & Work plan [*60*] Total = A_3

DATA SHEET

2.20.4	Technical = 80% Financial = 20% The formula for determining the financial scores is as following: Sf = 100 x Fm / F Sf = The financial score Fm = The lowest price F = The price of the proposal under consideration.
2.21.1	Address for Technical negotiations: Chief Engineer / S&C, Pakistan Railways, Headquarter Office, Empress Road, Lahore, Pakistan.
2.29	2.29.1 Time for completion of the assignment shall be **Six Months (06) months** after the mobilization period, excluding 15 days required by the Client for review and submission of comments on Draft Feasibility Report to the Consultants. 2.29.2 Mobilization Period, after signing of agreement shall be fifteen (15) days.

Details of Evaluation Criteria

1. Mandatory Requirements

i. As a mandatory requirement Consultants must have completed at-least two similar assignments. Any Consultant not fulfilling the said requirement is liable to be technically disqualified.

ii. Any Consultant who failed to complete Feasibility Study, already awarded to him and delay has occurred more than six months (without legitimate time extension) shall be awarded with negative marking of 10 Marks per assignment.

iii. A Professional Expert will not be considered for Evaluation if he has been already engaged in more than 1 ongoing Consultancy Assignment

(1) Company Profile (100 Marks)

a) Number of similar assignments (40 Marks)

One Project	= 8
Two Project	= 16
Three Project	= 24
Four Project	= 32
Five Project	= 40

i). Similarity will be established and weightage will be given as under:

Strong = 100%, Medium = 80%, Weak = 70%

b) Value of similar assignments (40 Marks)

For completed projects having value

80% or more of this assignment	= 100%
50% to 80%	= 80%
Less than 50%	= 70%

For the purpose of Technical Evaluation, with a view to compare the cost of projects executed by the Consultants with this consultancy assignment, the estimated cost of this consultancy assignment shall be considered as Rs.50 Million.

c) Organizational structure (10 Marks)

Excellent = 100%, Good = 80%, Satisfactory = 60%

d) Financial Capabilities (10 Marks)

Annual Turnover (Pak Rs in Million)

More than or equal to 500	= 100%
More than or equal to 300 but < 500	= 80%
Less than 300	= 50%

(2) Project Team

For minimum qualification and experience of project team please refer to Appendix-II to Data Sheet. Each member of Consultant's team will be evaluated on the following criteria:

i). Education (40%)

MSc or equivalent	= 100%
BSc or equivalent	= 90%

Higher education i.e., MSc shall be considered only if these are in relevant field / discipline.

In case the Consultants provide two CVs, one for foreign and other for local professional for particular professional category, then CV of the foreign professional will be considered for the purpose of Technical Evaluation.

Appendix-I to Data Sheet (contd…..)

Details of Evaluation Criteria

ii). Experience (30%)

Where overall experience is 20 years
Twenty five years or more= 100%
20 to <25 years = 90%
Less than 20 years = 0% (Staff will not be considered for evaluation)

Where overall experience is 15 years
Twenty years or more = 100%
15 to <20 years = 90%
Less than15 years = 0% (Staff will not be considered for evaluation)

Where overall experience is 10 years
Fifteen years or more = 100%
10 to <15 years = 90%
Less than10 years = 0% (Staff will not be considered for evaluation)

iii). No of similar assignment (30%)

Five or more = 100%
2 to less than 5 = 80%
Less than two = Zero

(3) Approach & Methodology

Methodology submitted by Consultant will be analyzed by evaluating team and graded as under:

Quality	Grade	Weight
Excellent	A	100%
Good	B	70%
Average / below average	C	50%
Absent	D	0

Methodology will be analyzed based on following:

a) **Understanding & Innovativeness**

i). What is the depth of the firm's understanding of the requirements and objectives of the consultancy assignment?

ii) What is the quality of the improvements to the TOR suggested by the consultant to improve the outcome of the assignment?

iii) What is the level of identification of potential risks that will affect the execution of the assignment, and what is the quality of the mitigation strategies proposed?

b) **Methodology & Work plan**

i) How in-depth is the Statement of Work: does it fully cover the scope of the assignment and is it sufficiently developed to ensure assignment completion?
ii) How developed is the Work Breakdown Structure (WBS) for the assignment?
iii) How suitable is the Work Plan (staffing schedule): is the resource utilization sufficient and practical?

Appendix-II to Data Sheet

Minimum Qualification and Experience required for each position in Project Team

1. The professional having experience less than minimum specified below shall not be considered

Sr. No.	Position	Min-Qualification	Overall Experience	Min-Relevant Experience
1	Project Manager (Permanent way Expert)	B.Sc. Civil Engineering	20 years	10 years
2	Railway Expert / Bridges & Structures	M.Sc. Structure Engineering	15 years	8 years
3	Railway Alignment Design Expert	B.Sc. Civil Engineering	15 years	8 years
4	Railway Expert / Train Operation	B.Sc. Civil Engineering / Mechanical Engineering or any transportation expert with graduation and inducted in railways under occupational group of railway (Traffic & Commercial)	15 years	8 years
5	Railway Expert / Signaling & Telecom	B.Sc. Electrical / Signaling /Telecommunication Engineering	15 years	8 years
6	Railway Expert / Electrical	B.Sc. Electrical Engineering	15 years	8 years
7	Railway Expert / Mechanical	B.Sc. Mechanical Engineering	15 years	8 years
8	Transport Economist & Financial Specialist	M.Sc./M.A Economics / CA	15 years	8 years
9	Environmental & Social Expert	M.Sc. Environmental Engineering / Sciences	15 years	8 years
10	Transportation Expert	Master in Transportation Planning / Engineering	15 years	8 years
11	Geologist / Tunnel Expert	M.Sc. Geology / Mining Engineering	15 years	8 years
12	Geo-Tech Expert	M.Sc. Geotechnical / Geological Engineering	15 years	8 years
13	Hydrology Expert	M.Sc. Hydrology/Water Resources Engineering./Hydraulics Engineering	15 years	8 years
14	Topographic Survey Expert	B.Sc. Civil Engineering	10 years	5 years
15	GIS Expert	M.Sc. GIS	10 years	5 years

2. Similar project has been defined under definitions for the purpose of comparison of the projects completed by the Consulting firm and assignment under consideration. For various professionals, the similar assignment shall

be as per their respective field of specialization.

Section 3: Technical Proposal – Standard Forms

CONSULTANTS ARE REQUIRED TO PREPARE TECHNICAL PROPOSAL AS PER FOLLOWING FORMAT:

TECH-1 Technical Proposal Submission Form

TECH-2 Consultant's Organization and Experience

A Consultant's Organization
B Consultant's Experience

TECH-3 Comments or Suggestions on the Terms of Reference.

TECH-4 Description of the Approach, Methodology and Work Plan for Performing the Assignment

TECH-5 Composition of Team to be deployed for this assignment and Task Assigned

TECH-6 Curriculum Vitae (CV) of Proposed Professional Staff

TECH-7 Staffing Schedule

TECH-8 Financial Capabilities

FORM TECH-1 TECHNICAL PROPOSAL SUBMISSION FORM

(***Please submit on Company's Letterhead***)

To: **The Chief Engineer / S&C,**
Pakistan Railways,
Headquarter Office,
Lahore, Pakistan.

Subject: **FEASIBILITY STUDY IN CONNECTION WITH UP-GRADATION/REHABILITATION OF EXISTING LINE AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL-SHORKOT-CHAK JHUMRA-SANGLA HILL-WAZIRABAD (324 KMS) & SHAHDARA BAGH -SANGLA HILL (90 KMS) RAIL LINK**

Dear Sir,

We, the undersigned, offer to provide the subject in accordance with your Request for Proposal. We are hereby submitting our Proposal, which includes this Technical Proposal, and a Financial Proposal sealed under separate envelopes.

We are submitting our Proposal in association with:_____
[*Insert a list with full name and address of each associated Consultant*]

We hereby declare that all the information and statements made in this Proposal are true and accept that any misinterpretation contained in it may lead to our disqualification.

If negotiations are held during the period of validity of the Proposal, we undertake to negotiate on the basis of the proposed staff. Our Proposal is binding upon us and subject to the modifications resulting from Agreement negotiations.

We undertake, if our Proposal is accepted, to initiate the consulting services related to the assignment not later than the date indicated in the Data Sheet of the proposal.

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: _____
Name of Firm: _____
Address: _____

FORM TECH-2 CONSULTANT'S ORGANIZATION AND EXPERIENCE

A - Consultant's Organization

Please provide the following information for your firm/entity and each associate for this assignment

1. Firm's Background and Achievements (min two pages)
2. Organogram.
3. List of professional Staff with Qualification and Experience.

FORM TECH-2 CONSULTANT'S ORGANIZATION AND EXPERIENCE

B - Consultant's Experience

[*Using the format below, provide information on each assignment for which your firm, and each associate for this assignment, was legally contracted as a corporate entity or as one of the major companies within an association, for carrying out consulting services* ***similar to the ones requested under this Assignment***.]

Assignment name:	Value of the Project (in Pak Rs or US$):
Country: Location within country:	Duration of assignment (months):
Name of Client:	
Start date (month/year): Completion date (month/year):	Value of consultancy services provided by your firm under the agreement (in Pak Rs or US$):
Name of associated Consultants, if any:	Percentage of input provided by associated Consultants:
Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):	
Narrative description of Project:	
Description of actual services provided by your staff within the assignment:	

FORM TECH-3

Comments or suggestions on the TOR.

(Client is not bound to accept the suggestions provided by the Consultants. The Consultants are requested not to include any financial impact of the their suggestions in the Financial Proposal. Any claim on this account shall not be accepted at the stage of evaluation or after award of contract)

FORM TECH-4 DESCRIPTION OF APPROACH, METHODOLOGY AND WORK PLAN FOR PERFORMING THE ASSIGNMENT

[*Technical approach, methodology and work plan are key components of the Technical Proposal. You are suggested to present your Technical proposal divided into the following three chapters:*

a) Technical Approach and Methodology,
b) Work Plan
c) Organization and Staffing

a) **Technical Approach and Methodology.** In this chapter you should explain your understanding of the objectives of the assignment, approach to the services, methodology for carrying out the activities and obtaining the expected output, and the degree of detail of such output. You should highlight the problems being addressed and their importance, and explain the technical approach you would adopt to address them. You should also explain the methodologies you propose to adopt and highlight the compatibility of those methodologies with the proposed approach.

b) **Work Plan.** In this chapter you should propose the main activities of the assignment, their content and duration, phasing and interrelations, milestones, constraints (including interim approvals by the Client), and delivery dates of the reports. The proposed work plan should be consistent with the technical approach and methodology, showing understanding of the TOR and ability to translate them into a feasible working plan. A list of the final documents, including reports, drawings, and tables to be delivered as final output, should be included here.

c) **Organization and Staffing.** In this chapter you should propose the structure and composition of your team. You should list the main disciplines of the assignment, the key experts responsible, and proposed technical and support staff.

FORM TECH – 5 COMPOSITION OF PROFESSIONAL STAFF TEAM TO BE DEPLOYED FOR THIS ASSIGNMENT AND TASK ASSIGNED

Name of Staff	CNIC / Passport No.	Firm	Area of Expertise	Position Assigned	Task Assigned
For Foreign Professional Staff					
For Local Professional Staff					

FORM TECH-6 CURRICULUM VITAE (CV) OF PROPOSED PROFESSIONAL STAFF

1. **Proposed Position** [*only one candidate shall be nominated for each position*]: ____
2. **Name of Firm** [*Insert name of firm proposing the staff*]: _____

_____

3. **Name of Staff** [*Insert full name*]: _____
4. **Date of Birth**:_____**Nationality**: _____
5. **CNIC No (**if Pakistani**):_____or Passport No: _____**
6. **Education:**

Degree	***Major/Minor***	***Institution***	***Date (MM/YYYY)***

7. **Membership of Professional Associations**: _____

_____

8. Other Training [*Indicate significant training since degrees under 6 - Education were obtained*]:

_____

_____

9. Languages [*For each language indicate proficiency: good, fair, or poor in speaking, reading, and writing*]:

_____

10. Employment Record [*Starting with present position, list in reverse order every employment held by staff member since graduation, giving for each employment (see format here below): dates of employment, name of employing organization, positions held.*]:

Employer	***Position***	***From (MM/YYYY)***	***To (MM/YYYY)***

11. Detailed Tasks Assigned

[*List all tasks to be performed under this assignment*]

12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned

[*Among the assignments in which the staff has been involved, indicate the following information for those assignments that best illustrate staff capability to handle the tasks listed under point 11.*]

1) Name of assignment or project: ____
   Year: _____
   Location: _____
   Client: _____
   Main project features: _____
   Positions held: _____
   Activities performed: _____
2) Name of assignment or project: ____
   Year: _____
   Location: _____
   Client: _____
   Main project features: _____
   Positions held: _____
   Activities performed: _____

3) Name of assignment or project: ____ Year: _____ Location: _____ Client: _____ Main project features: _____ Positions held: _____ Activities performed: _____
4) Name of assignment or project: ____ Year: _____ Location: _____ Client: _____ Main project features: _____ Positions held: _____ Activities performed: _____
5) Name of assignment or project: ____ Year: _____ Location: _____ Client: _____ Main project features: _____ Positions held: _____ Activities performed: _____

13. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

_____Date: _____

[Signature of staff member or authorized representative] *Day/Month/Year*

Full name of authorized representative: _____

FORM TECH – 7 PROFESSIONAL STAFFING SCHEDULE[1]

Year: 2015-16														
No	Name of Staff	Total staff-month input												
		1	2	3	4	5	6	7				Home	Field[3]	Total
For Foreign Professional Staff														
1		[Home]												
		[Field]												
2														
3														
For Local Professional Staff														
1		[Home]												
		[Field]												
2														
3														

1 For Professional Staff the input should be indicated individually; for Support Staff it should be indicated by category (e.g: draftsmen, clerical staff, etc.).

2 Months are counted from the start of the assignment. For each staff indicate separately staff input for home and field work.

3 Field work means work carried out at a place other than the Consultant's home office

FORM TECH-8 FINANCIAL CAPABILITIES

1. Total Assets = (in Million Pak Rs or US$)
2. Total Liabilities =

3. <u>Annual Turnover</u>

For the year		
2013-14	**2014-15**	**2015-16**

For assessment purpose average turnover of three years shall be considered

(in case of joint venture please provide above information for all partners)

Section 4: Financial Proposal - Standard Forms

Financial Proposal Standard Forms shall be used for the preparation of the Financial Proposal.

FIN-1	Financial Proposal Submission Form
FIN-2	Summary of Costs
FIN-3	Breakdown of Cost for Local Component and Foreign Remittance
FIN-4	Breakdown of Remuneration of Staff deployed for Feasibility Study
FIN-5	Breakdown of Reimbursable Expenses

FORM FIN-1 FINANCIAL PROPOSAL SUBMISSION FORM

(***Please submit on Company's Letterhead***)

[*Location, Date*]

To:

Chief Engineer / S&C
Pakistan Railways', Headquarters Office,
Lahore

Subject: **FEASIBILITY STUDY IN CONNECTION WITH UP-GRADATION/REHABILITATION OF EXISTING LINE AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL-SHORKOT-CHAK JHUMRA-SANGLA HILL-WAZIRABAD (324 KMS) & SHAHDARA BAGH -SANGLA HILL (90 KMS) RAIL LINK.**

Dear Sir,

We, the undersigned, offer to provide the consultancy services for subject assignment in accordance with your Request for Proposal and our Technical Proposal. Our attached Financial Proposal is for the sum of [*Insert amount(s) in words and figures*]. This amount is inclusive of all applicable taxes.

Our Financial Proposal shall be binding upon us subject to the modifications resulting from Agreement negotiations, up to expiration of the validity period of the Proposal.

No commissions or gratuities have been or are to be paid by us to agents relating to this Proposal and Agreement execution.

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: _____

Name of Firm: _____

Address: _____

_____

FORM FIN-2 SUMMARY OF COSTS

Item	Costs (Pak Rupees)	
	In Figure	**In Words**
Feasibility study in connection with up-gradation/rehabilitation of existing line and construction of additional line (doubling) on khanewal-shorkot-chak jhumra-sangla hill-wazirabad (324 kms) & shahdara bagh -sangla hill (90 kms) rail link.		

Note:

1. Cost of Feasibility Study should be inclusive of all applicable taxes, overheads and any other cost required to complete the assignment as per ToR.
2. Any tax imposed by the government after submission date of RFP shall be paid separately to Consultant, in addition to accepted Financial Proposal.

Authorized Signature of Consultants

FORM FIN-3 BREAKDOWN OF COST FOR LOCAL COMPONENT AND FOR FOREIGN REMITTANCE

Item	Amount (Pak Rs)		
	Payment of Local Staff & other expenditure	**Payment of Foreign Staff & other expenditure required to be remitted to home country**	**Total**
Feasibility study in connection with up-gradation/rehabilitation of existing line and construction of additional line (doubling) on khanewal-shorkot-chak jhumra-sangla hill-wazirabad (324 kms) & shahdara bagh -sangla hill (90 kms) rail link.			

Note:

1. All payments shall be made in Pak Rupees, however the above breakup is to facilitate the Consultants in the remittance in foreign currency of remuneration paid to the foreign staff of the Consultant in Pak Rupees.

Authorized Signature of Consultants

FORM FIN-4 BREAKDOWN OF REMUNERATION OF STAFF DEPLOYED FOR FEASIBILITY STUDY

Name[2]	Position[3]	Staff-month Rate (PKR)[4]
Foreign Professional Staff		
		[Home]
		[Field]
Local Professional Staff		
		[Home]
		[Field]

1. Form FIN-4 shall be filled in for the same Professional and Support Staff listed in Form TECH-7.
2. Professional Staff should be indicated individually; Support Staff should be indicated per category (e.g.: draftsmen, clerical staff)
3. Positions of the Professional Staff shall coincide with the ones indicated in Form TECH-5.
4. Indicate separately staff-month rate for home and field work.

FORM FIN-5 BREAKDOWN OF REIMBURSABLE EXPENSES

(Information to be provided in this Form shall only be used to establish payments to the Consultant for possible additional services requested by the Client)

No.	Description[1]	Unit	Unit Cost (Pak Rupees)
1	Per diem allowances	Day	
2	International Flight[2]	Trip	
3	Miscellaneous travel expenses	Trip	
4	Communication costs between [Insert Place] and [Insert Place]		
5	Drafting , reproduction of reports		
6	Equipment, Instruments, materials, supplies		
7	Shipment of personal effects	Trip	
8	Use of Computers , software		
9	Laboratory tests / surveys.		
10	Sub agreements		
11	Local transportation costs		
12	Office rent, clerical assistance		
13	Training of Client' personnel / International Study Tour		
14	International Seminar		

1. Delete items that are not applicable or add other items if required.
2. Indicate route of each flight, and if the trip is one-or two-ways.

Terms of Reference

Section-5

TERMS OF REFERENCE (TOR)

FOR

FEASIBILITY STUDY

FOR

FEASIBILITY STUDY IN CONNECTION WITH UP-GRADATION/REHABILITATION OF EXISTING LINE AND CONSTRUCTION OF ADDITIONAL LINE (DOUBLING) ON KHANEWAL-SHORKOT-CHAK JHUMRA-SANGLA HILL-WAZIRABAD (324 KMS) & SHAHDARA BAGH -SANGLA HILL (90 KMS) RAIL LINK.

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TERMS OF REFERENCE (TOR)

1 Project Background

Pakistan Railways intends to carry out feasibility study of existing rail link from Shahdara-Khanewal via Sangla Hill ,Faislabad and Sangla Hill to Wazirabad with a view to ascertain the existing condition of the infrastructure and improvements required to achieve the speed of 160 Km/h. The project will cater for the future transportation requirements of the industrial hub of Faislabad.

The existing railway link between Shahdara-Khanewal via Sangla Hill ,Faislabad and Sangla Hill to Wazirabad has high operational importance as it provide linkage to third most popular industrial city of Faislabad for both ends of ML-1. Presently 5 long distance trains are running on this sections besides other intercity trains and if up-graded it will attract long distance passenger and industrial traffic from and to Faislabad

(Project area Map is attached as (Appendix-A)

Following are the details of the entire study section:-

	Sections		Chainage(Km)
1	Shahdara	Sheikhupurah	32.49
2	Sheikhupurah	Sangla Hill	57.78
3	Sangla Hill	Faislabad	44.55
4	Faislabad	Shorkot	107.42
5	Shorkot	Khanewal	62.51
6	Sangla Hill	Wazirabad	110
	Total		**414.75**

2 OBJECTIVES OF THE FeaSIBILITY STUDY

Feasibility studies for Up-gradation of Main Line 1 and Main Line 2 have been conducted keeping in view future traffic influx due to CPEC. In this regard it is extremely important to foresee the effect of CPEC on traffic growth on the remaining Railway Network. The up-gradation of these sections is also considered necessary to support overall economic growth.

In this regard up-gradation of Shahdara-Khanewal via Sangla Hill ,Faislabad and Sangla Hill to Wazirabad is proposed to be studied as this section is already carrying 5 long distance trains and connects industrial hub of faislabad with Main Line 1 at both ends.

3 Scope of work

The rehabilitation/improvement of existing track is desired to be carried out to achieve higher speed as mentioned in Appendix-B. All the infrastructure including right of way shall be proposed for double railway track. However construction of single line or double line will be recommended by the consultant based on traffic volume. The successful Consultant will focus on but not limited to following works to achieve the desired output:-

i) Study of the existing condition of the track infrastructure on the entire section based on the data/information made available by the Client and preparation of Track Condition Report. This report will form the basis for the proposed up-gradation / rehabilitation of track infrastructure to enhance the line capacity and make the railway track fit for a speed and axle load as mentioned in Appendix-B.

ii) Bridge Condition Survey of major and key bridges which require Rehabilitation / Extension / Reconstruction to maintain desired operational speed and axle load as mentioned in Appendix-B. The remodeling or extension of bridges, if necessiated by changed hydrology, will be examined.

iii) Study for up-gradation/conversion of Level Crossings (at grade crossing) into overhead bridge / underpass / manned level crossings where necessary, based on traffic count, vulnerability and adverse geometrical conditions.

iv) Study for improvement of signaling and telecommunication system.

v) Plan and Profile of the entire corridor including areas which need horizontal or vertical alignment improvement. (Topographic Survey) i.e. easement of sharp curves & grades (where possible) to achieve the design speed as mentioned in Appendix-B.

vi) Traffic Study for assessment of Passenger & Freight Traffic demand after 5, 15 and 30 years of upgradation and rehabilitation.

vii) Geotechnical Investigations along the railway alignment, specially at locations where new bridges or other structures are to be built.

viii) Study for provision / improvement of water supply and drainage system at the stations

ix) Power Supply Study, for provision / improvement of electricity to key stations and other installations on the section.

x) Preparation of Environment Impact Assessment Report.

xi) Study of existing railway yards. Preparation of proposal for remodeling of yards to remove bottlenecks (if any) and make them fit for the designed speed and cater for long haul freight trains. Addressing the drainage problem of station yards and drainage along/across the track where the track level become lower than adjoining areas and is prone to flooding.

xii) Study of existing buildings and proposal for their up-gradating particularly station buildings (where required).

xiii) Proposal for construction of boundary wall / fencing alongwith the corridor and in major railway yards to restrict the tress passing.

xiv) Study for improvement / establishment of maintenance facilities for Locomotives, Carriages and Freight Wagons at Faislabad and Shorkot.

xv) Financial and Economical Analysis.

xvi) Cost estimation of Up-gradation of track and infrastructure.

xvii) Preparation of comprehensive Feasibility Study Report of international standard suitable for assessment by international financial institutions.

3.1 Up-gradation / Rehabilitation of Track Infrastructure

3.1.1 The data/information to be provided by the Client

The Client shall provide the data/information in respect of of track infrastructure, and it will include the following components.

3.1.1.1 <u>Rails</u>

Different types of rails laid in the track, their kilometer-wise location, their year of manufacture / laying in track. Locations, where the rails are welded as LWR or SWR or where the rails form the jointed track and general condition of rails

3.1.1.2 Sleepers

Different types of sleepers laid in the track, their kilometer-wise location, their density, year of their manufacture and year of laying in track. Condition and percentage of unserviceable sleepers, location (kilometer-wise)

3.1.1.3 Track Fastening System

Different types of track fastenings laid in the track, their kilometer-wise location, their year of manufacture and year of laying in track. Condition and percentage of unserviceable track fastenings, location (kilometer-wise)

3.1.1.4 Points & Crossings

The name of the railway station, the location and number & type of the points and crossing at the station, their angle of crossing. Type of rails used in each point and crossing and their condition

3.1.1.5 Loops & Sidings

The name of the railway station, the description and line number of the main line, loop lines sidings as indicated in the station yard plan including the clear stabling length (CSL) of each line.Type of rails and sleepers etc.

3.1.1.6 Private Sidings

The name of the railway station, the description of the private sidings including the name of the sponsoring authority and other details of siding

3.1.1.7 Condition of Ballast

Description of the condition of the ballast, average existing ballast cushion in track and on shoulders etc

3.1.1.8 Curves

List of all the existing curves on every sub-section, indicating the serial number of the curve, its degree and radius in feet/meters, its chainage and total length in feet and meters, the super elevation provided in inches and millimeters and whether the curve is circular or transitioned.

3.1.1.9 Gradients

List of gradients for every sub-section, indicating the location and chainage of every grade and whether it is in up or down direction (ascending or descending)

3.1.1.10 Bridges

List of existing bridges on every sub-section, indicating their serial number on that sub-section, their location, type and span etc. Annual bridge inspection registers and other inspection reports, which indicate current general condition of bridges.

3.1.1.11 Foot over Bridges & Road over Bridges

List of all the foot over bridges and road over bridges existing on every sub-section, indicating their serial number on that sub-section, its location, type and width etc.

3.1.1.12 Level Crossings

List of level crossings existing on every sub-section, indicating their serial number on that sub-section, the location, the class of level crossing, manned or un-manned, traffic or engineering, the width of level crossing, the length of check rail (single or double), interlocked or not, etc.

3.1.1.13 Tress Passing Locations

List of all locations where there is regular trespassing of the track, indicating the location and other details of such sites.

3.1.1.14 Sui gas & other Utility Services Crossings

List of the pipe line crossings under the existing railway line for passage of sui gas or other utility services e.g. water supply, telephone and telecommunications cables etc. shall be provided, indicating the type of the utility service, the name of the sponsoring agency, size and other details of the crossing

3.1.1.15 River Training Works and Protection Bunds

Details of any river training works and/or flood protection work(s) provided along or across the existing railway embankment, giving its brief details , including its location, type of protection work, purpose for its provision, its length and cross section.

3.1.2 The Preparation of Track Condition Report

The Consultant shall study in detail the existing condition of the track infrastructure including track structure, bridges, foot bridges, road over bridges / underpasses and formation etc. on the entire section, based on the data/information provided by the Client under sub-section 3.1.1 above and prepare the of Track Condition Report.

In addition to above data provided by the Client, the Consultant will also assess the condition of existing embankment, track infrastructure, bridges, level crossing etc during field visits and topographic survey.

Based on the results of the above referred Track Condition Report, assesment of embankment by the Consultnat and the output of the field studies and investigation to be carried out under the requirements of sub-sections detailed hereafter, and shall prepare feasibility study level preliminary design of all the components of work conforming to track parameters laid down in Appendix B of the document, to be able to work out the quantities of items of work, the cost of work and to enable the client to prepare biding documents accordingly.

3.2 Bridge Condition Survey and Rehabilitation / Extension / Reconstruction for bridges

3.2.1 Selection of Sample Bridges for Detailed Testing

The summary of bridges showing various types is attached as **Appendix-C**.

The Client will provide available data of the bridges, however, the Consultant shall inspect all bridges in general for visual condition survey. In addition to visual survey of all bridges the Consultnat shall carryout detailed inspection / testing of selected 30 representative bridges of various types, as detailed in table A, The exact location of each of these 30 bridges shall be finalised in consultation with the Client representing bridges of all type, sizes in various geographical locations / sections and tested / studied in detail:

Sections	**Girder Bridge upto 40'**	**Girder Bridge over 40'**	**Other Bridges**	**Total**
Khanewal-Shorkot	2	3	2	7
Shorkot-Faislabad	4	3	1	8
Sangla Hill - Wazirabad	3	3	1	7
Sangla Hill-	3	4	1	8

Shahdara				
Total	12	13	5	30

The above numbers of bridges are tentative and can be altered based on technical or other reasons with mutual consent of Consultant and Client.

Based on the detailed study / testing of above stated selected bridges, the Consultant will draw their conclusions and recommend a comprehensive plan for reconstruction or rehabilitation, strengthening, heavy repair and ordinary repair of all bridges.

3.2.2 Methodology for Condition Survey of Selected Bridges

The methododology for condition survey of selected bridges will include:

i) Collection and review of drawings, previous studies, investigations (if available).

ii) Reconnaissance surveys and field investigations to collect all parameters required for the study.

iii) Development of Testing Program for detailed assessment and investigation of identified key structures.

iv) During condition survey, the Consultant shall carry out the non-destructive testing of the structures where considered necessary to assess the available strength of the structures.

v) For steel structures, the strength reduction factors recommended by the international codes of practice and the recommended methods of analysis using respective software shall be used by the Consultant.

vi) In case of unavailability of sub-structure drawing, the analysis would be carried out on typical drawing of respective foundation.

vii) The results of structural analysis shall be presented in the form of reports, defining clearly the methodology adopted for analysis, the input parameters and the results in comparison with limiting values of inner forces recommended by the respective codes of practice.

viii) Recommendations for rehabilitation and strengthening of structures.

ix) Recommendations for reconstruction with proposed sub –structure and super structure and cost estimation

x) Based on the detailed study of the selected 30 representative bridges, preparation of cost estimates for rehabilitation /

reconstruction of all bridges shall be prepared to arrive at the total improvement cost.

xi) Preparation of Final Assessment Report.

3.2.2.1 Field Reconnaissance Surveys and Investigations

A team of the Consultant's experts shall visit each of the selected bridge (identified for detailed testing and investigation) to collect all pertinent data including layout dimensions, sub structure details, elevations, geotechnical, geological, hydrological and topographic conditions. Any defects/damages in the substructure and superstructure shall also be identified. This visual survey will be conducted using pre-developed proformas compliled with extensive photography of the structure, in question. The nature and extent of the non-destructive testing will also be established during the visit.

After assessment based on the field visit and data collected, the bridges/culverts shall be categorized into three categories

i) The structures which structurally meet the revised requirements of loads and speed and do not require structural improvement.

ii) The structures which will require rehabilitation/strengthening, and

iii) The structures which will be replaced/reconstructed.

3.2.2.2 Development of Non-destructive and Destructive Testing Program

The Consultant shall carve out a testing program based on national and international standard practice in consultation with the Client. The proposed testing program shall be governed by the requirements of various international standards like ACI, ASTM, EN and AREMA etc.

3.2.2.3 Non-destructive Testing (NDT)

The existing bridges on the section have been divided into following four groups for the selection of representative bridges for detailed testing.

i) Concrete slab/girder bridges
ii) Steel girder/truss bridges
iii) Masonry arch bridges
iv) RCC/Hume Pipe culverts

3.2.2.4 Non-destructive Testing of Concrete slab/girder bridges

The quality of new concrete structures is dependent on many factors such as type of cement, type of aggregates, water cement ratio, curing, environmental conditions etc. Besides this, the control exercised during construction also contributes a lot to achieve the desired quality. The present system of checking slump and testing cubes, to assess the strength of

concrete is not sufficient as the actual strength of the structure depends on many other factors such as proper compaction and effective curing etc.

Considering the above requirements, need of testing of hardened concrete in new structures as well as old structures, is there to assess the actual condition of structures.

Non-Destructive Testing (NDT) techniques can be used effectively for investigation and evaluating the actual condition of the structures. These techniques are relatively quick, easy to use, cheap and give a general indication of the quality of the concrete.

This approach will enable us to find suspected zones, thereby reducing the time and cost of examining a large mass of concrete. The choice of a particular NDT method depends upon the property of concrete to be observed such as strength, corrosion, crack monitoring etc.

The subsequent testing of structure will largely depend upon the result of preliminary testing done with the appropriate NDT technique. The NDT being fast, easy to use at site and relatively less expensive can be used for

i) Testing any number of points and locations

ii) Assessing the structure for various distressed conditions

iii) Assessing damage due to fire, chemical attack, impact, age etc.

iv) Detecting cracks, voids, fractures, honeycombs and weak locations

v) Assessing the actual condition of reinforcement

Rebound Hammer Test (Schmidt Hammer) is commonly used for the field assessment of the compressive strength of the existing concrete bridges.

3.2.2.5 Non-destructive Testing of Steel girder/truss bridges

On Pakistan Railways, the superstructure of large number of major bridges is of steel, and substructure is generally of concrete/masonry. These steel bridges were fabricated using structural steel section i.e. channels, angles, plates and I-sections etc. The bridges are subjected to severe dynamic stresses under passage of traffic and because of these stresses; the deterioration of the materials takes place.

In the existing system of inspection, the focus is on visual inspection of the various parts of bridges, rivet testing and inspection of bearings etc. But all these methods do not given any indication about the micro-cracking, presence of flaws/ internal blow holes/lamination etc. in the bridge members. Moreover some of the members of the bridge girders are difficult to inspect

because of inaccessibility and in those cases, the NDT technique can be used effectively for inspection and evaluation of structures.

The Consultant shall adopt one of the following methods for the non-destructive testing of steel bridges:

i) Liquid penetrant testing

ii) Magnetic particle testing

iii) Electromagnetic testing or Eddy current testing

iv) Radiography

v) Ultrasonic testing

3.2.2.6 Non-destructive Testing of Masonry bridges

NDT methods for testing of masonry structures are not very common in Pakistan. Sometimes very critical defects like, deterioration of bricks masonry and mortar etc, internal cavities formed due to rat holes and cracking of structures due to overstressing go unnoticed which may prove to be very fatal for the safety of structure. The NDT methods have a large potential to be part of system for inspection and monitoring of structures. This includes quality assurance during and after construction, identification of damages in an early stage and to decide the

repair strategy for rehabilitation of the structures. Some of the NDT methods which can the Consultant be used for evaluation and inspection of masonry structures are listed below.

i. Flat Jack Testing

ii. Impact Echo Testing

iii. Impulse radar testing

iv. Infrared thermography

3.2.2.7 Destructive Testing by Core-extraction for Determination of Compressive Strength of Concrete and Masonry Bridges

Core Specimens- A core specimen for the determination of compressive strength shall have a diameter at least three times the maximum nominal size of the coarse aggregate used in the concrete, and in no case shall the diameter of the specimen be less than twice the maximum nominal size of the coarse aggregate. The length of the specimen, when capped, shall be as nearly as practicable twice its diameter.

3.2.3 Structural Analysis of Selected Bridges

Based on the results of above stated detailed testing, fully integrated models of selected bridges shall be developed and analyzed by the Consultant. All input parameters like geo-tech conditions; substructure and superstructure conditions shall be incorporated in these models to represent actual on-site conditions. Finite Element Analysis Programs (e.g. SAP 2000 and Staad Pro or any latest version of equivalent software patent in market) shall be used to determine the effects of increased loads on these structures. This assessment/analysis will be carried out in accordance with the relevant provision of AREMA, Pakistan Railways Bridge Rules-1970, AISC and ACI specifications. The loads to be applied include dead, live and impact loads, tractive effort, breaking force, centrifugal, longitudinal, wind, stream flow, buoyancy, seismic and other applicable loads/forces and their prescribed combinations.

The current bridge loadings included in Pakistan Railways Bridge Rules-1970, tabulated below were introduced in 1926 and were based on the trials conducted on steam locomotives in use at that time.

Bridge Loading standard	Maximum locomotive axle load	Trailing load
BG main line loading (BG ML)	22.5 tons	2.3 tons/ft
BG branch line loading (BG BL)	17.0 tons	1.5 tons/ft
BG high mineral loading (BG HM)	28.0 tons	2.3 tons/f
Longitudinal forces		
Maximum tractive effort (BG ML)	47.6 tons	
Maximum braking force (BG ML)	10% of trailing load.	

According to sub-section 3 of the Scope of Work, the existing bridges are to be analysed for speed and axle load as mentioned in Appendix-B and for train operation with D.E locomotives and trailing load comprising of high capacity freight wagons. The Consultants are requried to review the impact of the proposed rolling stock and increased speeds on the existing loading standards given in the Railway Bridge Rules 1970 , before applying them for structural analysis of the selected existing bridges on the section.

3.2.4 Interpretation of Results

The results of structural analysis shall be studied in detail to arrive at logical, reliable and efficient rehabilitation / strengthening measures required to upgrade the life expectancy and load carrying capacity of the structure under

study. If the above testing and analysis reveals that any strengthening measures will not be sufficient enough, demolition and reconstruction shall then be proposed.

3.2.4.1 Reporting and Presentation

The results of detailed investigation and analysis shall be presented to the Client for each studied structure and the recommendations / action plan given for each category of bridges (type / size / location) based on these studies. Recommendations shall be made for requisite rehabilitation / strengthening procedures to be followed for increasing the durability and reliability against intended loads and speeds as mentioned in Appendix-B. Preliminary designs and sketches for these rehabilitation/strengthening works shall also be appended to the report along with Preliminary cost estimates.

The proposed works shall be developed based on considerations of economy, constructability, durability, environment, strength, and serviceability. A tentative plan for carrying out rehabilitation/strengthening activities shall be provided in the report.

3.3 Hydrological Study

i) The Consultants shall carryout hydrological investigations with the analysis of rainfall and flood records supplemented by detailed field investigation for improving existing and providing new cross-drainage structures (where required) after proper hydrological and drainage evaluation. The Consultant shall identify key vulnerable points against the threat of floods and carryout regime study of major flood openings based on past flood history and prepare proposal for provision of additional flood openings of suitable sizes if needed to make it an all weather line. Consultant should also submit recommendations based upon concise field data for the closure of redundant bridges, culverts etc to eliminate the weak portion in the track infrastructure.

ii) The following data should be collected for preparation of Hydrological Study.

- Evidence of flooding and flood record data in the vicinity of study area.
- Historical data of flood passed through flood openings.
- Breach of railway embankment or damage to any bridge or protection works.
- Rainfall data.
- Water logged areas, slushy/marshy land.

- Saline area.
- Waterway area of existing structures.
- Nature of the stream bed.

3.3.1 Irrigation Canals / Rivers

The Consultant shall also inspect all bridges on rivers, canals / irrigation channels and report shall be made part of hydrology Study. The following data shall be obtained from the concerned Provincial Irrigation Department or WAPDA as the case may be:-

i) Maximum design discharge.
ii) Actual discharge.
iii) Velocity of flow at canal bed / river bed.
iv) Bed level and full supply level including freeboard.
v) Bed width, top width, bed and side slopes.
vi) Scour, if any and proposed remedy.

The result shall point out inadequacy, if any, and recommend remedial measures.

3.4 Study for Up-gradation/conversion of Level Crossings

The Consultant shall study all level crossings (at grade crossings) with a view to increase the safety of train and road users. The Consultant shall prepare a comprehensive report about level crossings after taking into consideration visibility of level crossing from track and road, previous accident history, interlocking arrangements, condition of road and road traffic data based on an appropriate census in consultation with Client. Based on the analysis the Consultant will also suggest (where required) provision of flyover or underpass and up-gradation of un-manned level crossings into manned level crossing besides shifting, to mitigate chronic problems or closure where above conditions of traffic data do not warrant further retention of level crossing. The Consultant shall also estimate the cost of such up-gradation and include it in the overall cost estimate of up-gradation of subject section.

3.5 Easement of sharp curves and grades to achieve the design speed

The Consultant shall study the entire curves and grades on study section and prepare a report regarding their suitability for increased speed and required hauling capacity. The Consultant shall also propose, if so required, the easement of curves to negotiate the proposed increased speed as mentioned in Appendix-B. In addition, where necessary the Consultant shall

propose easement of grades either by changing the level of proposed new track or by detouring. The Consultant will also prepare cost estimate of such interventions including the assessment of cost of additional land (if any) and include it in the overall cost estimation of up-gradation of subject section. This cost may include construction of track and bridges etc.

In case the easement of sharp curves or grades is expensive due to constraints such as presence of a bridges, station or dense population in vicinity of curve or grade, the Consultant must submit a detailed Cost estimate for shifting of bridge, station or re-settelment of Population along with recommendations for various possible solutions for economical resolution of these constriants.

3.6 Study for improvement of Signaling and Telecommunication System

The existing signaling and telecommunication on study section is completely outdated, ancient and life expired considering the modern day requirements of efficiency, safety and capacity. The Consultant shall study the existing signaling and telecommunication system over entire study section and prepare a comprehensive report regarding installation of new modern signaling system alongwith Centralized Traffic Control (CTC) commensurate with the anticipated line capacity to cater for the future traffic volumes. The new system shall be proposed in consultation with the Client. The Consultant shall also prepare cost estimate of new proposed modern signaling and telecommunication system.

3.7 Topographic Survey

3.7.1 Monumentation for the Permanent Control Points

The Consultant shall establish Permanent Survey Control Points, to be used as reference system. In this regard Permanent Ground Markers, made of precast concrete, of size 15cmx15cmx75cm or 4 inch dia PVC pipe filled with 1:2:4 PCC duly reinforced with suitable with 1 cm dia steel rod or steel nail in the center shall be fixed at every railway station but not more than 10 kms apart. Description of all the monuments along with photographs will be prepared by the Consultant.

3.7.2 Horizontal Control

i) Horizontal control for topographic survey shall be established by intermediate traversing. The traverse circuits shall be started and closed on the GPS monuments already established during the above

mentioned GPS survey. The transverse monuments measuring 15cm x15cm x75cm shall be fixed at one km interval.

ii) After verifying the accuracy of traverse circuit at known survey of Pakistan (SOP) control points, the plane control shall be calculated using scale factor. These plane coordinates shall be used for project survey.

iii) Azimuths shall be checked by Polaris/Solar observations at 10 to 15 Km interval.

iv) The minimum acceptable accuracy of the traverse line shall be 1/10, 000 or better.

3.7.3 Vertical Control

i) Vertical control shall be provided by double levelling based on national datum established by Survey of Pakistan.

ii) All the traverse points/ground markers established during horizontal control shall be connected to the levelling net.

iii) Vertical mis-closure within the levelling net shall not exceed + 10 K mm where K is the length of levelling line in kilo-meter.

3.7.4 Plan and Profile of the entire corridor

i) The Consultants shall carry out topographic survey of the entire study section by using GPS ground Survey method or by Total Station in consultation with client or use latest gadgets having more precision as compared to above mentioned devices. The adjusted co-ordinates and elevations of control points/traverse points shall be used for topographic survey. The topographic strip survey shall depict all the natural and man-made features within a corridor of railway land on either side of the track.

ii) The survey shall be tied to control/traverse points already established by the Consultant. A rough sketch of the area under survey shall be prepared. All the features shall be numbered and coded as “Strings”. Sufficient spot heights shall be observed to accurately represent the land form and provide height information, at regular intervals to produce an adequately detailed digital terrain model.

iii) On the stations the railway land on both sides is generally more than the block sections and ranges from 200 ft to 400 ft on either side of the railway line. It is not desired to cover the whole land on stations.

The scope includes only yards covering station building, platforms, all tracks, sidings, stabling lines, washing line, sick line, sheds and depots etc, up to building line on both sides.

iv) The topographic strip survey shall show the position, levels and lines of existing structures and their features, carriage ways, road shoulders, ridges, cliffs, river beds and banks, embankments etc.

v) Survey of Pakistan (SOP) control points or UTM shall be used for carrying out topographic survey.

vi) The Consultants shall plot the right of way, longitudinal profile, cross-sections, detail of utilities crossing under the track, electrical crossings over the track and other details necessary to make the best possible route for the design speed.

vii) In case of road crossings, the proposed alignment, angle of skew, width of road metalling, shoulders and top levels of the road surface shall be observed on both sides at adequate spots for plotting X-section and proposal for under pass/over head bridge would be prepared.

viii) Cross sections of railway embankment and profile shall be run at not more than 200 meters intervals. However, where required, due to important features or sudden topographic changes, the said interval should be reduced as per site requirements, following international best practices.

ix) Consultants shall also prepare Longitudinal Profile at the center of the existing track and center of new alignment (where applicable) to be plotted on 1/1000 horizontal and 1/100 vertical scale.

x) The survey data shall be computer processed using suitable software and computer aided mapping carried out to the desired scale. The mapping shall be in thematic layers format or any other better / latest techniques.

3.7.5 Marking of Major Track Components and Fixtures

The Consultant shall mark, but not limited to, the following features on topographic sheets / drawings showing detailed data of each:

i) <u>Level Crossings</u>

- Location (km) and Level Crossing Number.
- Sketch of Level Crossing, angle of crossing, visibility zone.
- Type of Level crossing.
- Width of Gates / Gate Posts.

- Width and type of Road, approach gradient of Road.
- Digital Photography.

ii) Bridges

- Location (km) and Bridge Number.
- Sketch of Bridge.
- Type of Bridge.
- Total Span with width of each span.
- Digital Photograph

iii) Curves

- Location (km from - to).
- Length of Curve.
- Degree / Radius of Curve.
- Circular or Transitioned
- Length of transition
- Super Elevation

3.8 Study of Passenger & Freight Traffic

3.8.1 Rail Transportation Demand

i) The Consultant shall determine the existing and future rail transportation demand (both passenger & freight) including demand for upcoming new coal fired power plants, existing power plants proposed to be converted to coal fired, new cement plants, industrial units / states, specially the demand generated due to completion of China Pakistan Economic Corridor (CPEC).

ii) The Consultant shall develop a computer based Diversion Model taking in to account diversion of traffic from road to rail on account of improvement in rial services besides other factors & varieable influencing generations & diversion of traffic from within the projects catchment area.

iii) The Consultant shall collect and analyze all the data necessary to make a sound estimate of the existing traffic demand in the base year and future transportation demand, both freight and passenger over the entire planning horizon. The assessment of the demand shall be for a project evaluation period of 30 years which is likely to affect the economic and financial viability of the project.

iv) The Consultant shall identify and quantify the factors contributing towards generation of potential traffic in the areas served by the project and in the areas likely to be served by future economic development. These factors will include, but not limited to:

- Population growth and changes in rural/urban population distribution in the study corridor;
- Regional and national economic growth with special focus on Lahore & Faislabad and the developments taking place in the area under CPEC.
- Growth of vehicle ownership in the key cities and the expansion of road network along the study corridor;
- Development of any special industrial zones, mining areas, special agricultural development within the project catchment area; and
- Development of tourism, social services, commercial centers, medical facilities, educational facilities which may impact the intercity passenger travel demand.
- Potential economic development due to CPEC.

v) All transportation demand forecasts shall be broken down by commodity and by origin/destination pairs.

vi) The Consultant shall develop probable modal split scenarios for the traffic taking into account the present and future modal attributes of road and rail transport in the catchment area of the project.

vii) The future rail transportation demand shall be projected under three scenarios namely "Base", "Low" and "High". Economic growth scenarios will be defined in consultation with the Client and other relevant government departments associated with forecast of economic growth forecast.

3.9 Geotechnical Investigations

3.9.1 Data Collection and Desk Study

The Consultants will collect all relevant data such as topographic, geologic and hydro-geological maps, and satellite imageries etc. Previous geotechnical investigations (if available) will also be collected.

Geologic maps will be utilized for construction material studies and delineation of problematic soils.

3.9.2 Reconnaissance and Condition Survey

After collection of data and desk study, a reconnaissance visit shall be undertaken to plan the geotechnical investigations. Features marked on maps

(such as problem soils) shall be confirmed in the field. Borrow areas shall be surveyed and identified.

3.9.3 Subsurface Geotechnical Investigations and Laboratory Testing

The subsurface investigations shall be planned through execution of boreholes, test pits, field testing and sampling followed by appropriate laboratory testing. The investigations shall be planned in such a way as to provide sufficient information about the condition and the strength of various sub-strata. All the field work shall be carried out under full-time supervision of Consultant's qualified engineer / expert.

3.9.3.1 Subsurface Geotechnical Investigations

The subsurface geotechnical investigations are aimed at revealing the general subsurface soil type at the site and its compactness and strength and help to ensure a safe and an economical design of various structures.

The subsurface geotechnical Investigations shall be carried out by drilling bore holes at approximate (average) intervals of 5 km including particular locations of bridges. However, total length of all boreholes has been estimated as 700 meter. Location and length of borehole shall be decided keeping in view the site situation and as per site requirement. Excavation of Test Pits (2.0 x 2.0 x 2.0 meter), maximum 5 kms apart along the alignment and in borrow areas.

The following minimum field investigations shall be carried out at the project site:

i) Execution of boreholes in overburden soil/rock, by straight rotary/heavy/light percussion drilling method including backfilling of boreholes to their original position using cement-sand-bentonite mix.

ii) Performance of Standard Penetration Tests (SPTs) in the boreholes in overburden soils generally at 1 m depth interval, including collection and preservation of spilt-barrel samples as per latest ASTM D - 1586.

iii) Execution of Cone Penetration Tests (CPT) in overburden soils at specified locations along section to be studied asper latest ASTM D-5778.

iv) Collection of relatively undisturbed soil samples (UDS) from each borehole through Shelby/Denison/Pitcher sampler including their waxing, labeling, packing, storage & transportation to an approved testing laboratory.

v) Excavation of test pits along railway alignment to be studied and in borrow areas below top of the ground in overburden soil including backfilling of test pit to original condition.

vi) Performance of field density tests by sand replacement method in test pits at selected horizons including collection of small disturbed samples in moisture tins, for determination of moisture content as well as labeling, packing, storage & transportation to an approved testing laboratory.

vii) Extraction of hand-cut Block samples (30cm*30cm*30cm) from test pits.

viii) Collection of composite bulk soil samples (at least 60 kg for sandy/clayey soils & 120 kg for gravelly soils) from test pits including their labeling, packing, storage & transportation to an approved testing laboratory.

ix) Performance of field permeability tests in specified boreholes with soil column or flush bottom condition using constant/falling/rising head method

x) Collection of ground water samples (if encountered) from boreholes/test pits including their labeling, packing, storage & transportation to an approved testing laboratory.

3.9.3.2 Laboratory Testing

The laboratory tests will be carried out at an approved laboratory. Selected representative samples of soil/rock and water obtained during site investigations will be subjected to appropriate laboratory tests to evaluate the following engineering properties at the laboratory:

i) Classification

ii) Shearing Strength

iii) Tensile Strength

iv) Compressibility

v) Moisture density relationship

vi) Chemical characteristics

vii) Bearing capacity

viii) Swell/Collapse Potential

ix) Other relevant engineering characteristics such as suitability of borrow materials

3.9.4 Geological Cross-section along the railway alignment to be studied

Engineering geologic cross-section shall be developed relative to subsurface lithology resulting from geotechnical investigations.

3.9.5 Analysis and Report

The studies described above shall be summarized in the form of a comprehensive geological and geotechnical report which shall also include a general description of the site and field activities, location of all borings, test pits, groundwater elevation measurements, undisturbed samples details, field testing results, laboratory testing results, recommendations for borrow areas, foundation recommendations and capacity curves and results of geological studies and related maps etc.

3.10 Study for Provision / Improvement of Water Supply and Drainage System

The Consultant shall study the existing water supply and drainage system of all stations and other installations and provide expert opinion regarding suitability and sufficiency of existing system. The Consultant shall prepare preliminary / feasibility level design of Water Supply and drainage system. The Consultant shall prepare cost estimates of up-gradation / provision of water supply and drainage system.

3.11 Power Supply Study

The Consultant shall study the existing electricity supply system of all stations and other installations in consultation with the Client and provide expert opinion regarding suitability and sufficiency of existing system. The Consultant shall suggest improvement in existing system and propose any improvement, if needed to ecoomise the use of energy. The Consultant shall prepare preliminary / feasibility level design and cost estimate for improvement / provision of electricity over entire section to be studied.

3.12 Preparation of Environment Impact Assessment Report

The Consultants will conduct an Environmental Impact Assessment (EIA) to ensure that the development options under consideration are environmentally sound and sustainable, and that environmental consequences are recognized early in the project cycle and taken into account in the project planning, route selection and design.

EIA identifies ways of improving the project environmentally and minimizing, mitigating or compensating for adverse impacts.

To conduct this environmental study, the Consultant will follow the guidelines issued by Government of Pakistan / Provincial Governent time to time.

3.12.1 Preliminary Environmental Status

Environmental Impact study shall assess in detail the potential environmental impact of the proposed action. The purpose of the review will be to discuss the environmental consequences of the proposed action, designed to alert the agency and other decision makers and the public at large as to the environmental risks involved. Environmental impact assessment shall present:-

i) A detailed description of the proposed action including information and technical data adequate to permit a careful assessment of environmental impact.

ii) Discussion of the probable impact on the environment, including any impact on ecological systems and any direct or indirect consequences that may result from the action.

iii) Any adverse environmental effects that cannot be avoided.

iv) Alternatives to the proposed action that might avoid some or all of the adverse environmental effects including analysis of costs and environmental impact of these alternatives.

v) An assessment of the cumulative long term effects of the proposed action.

vi) Any irreversible or irretrievable commitment of resources that might result from the action or that would curtail beneficial use of the environment.

3.12.2 Environmental issues to be addressed

The construction of railway line may result in environmental degradation if not properly planned for. The following environmental issues will accordingly be addressed:-

i) Air Pollution

ii) Noise

iii) Soil erosion

iv) Habitat destruction, community cohesion

v) Loss of vegetation

vi) Loss of wildlife

vii) Hydrographic modification

viii) Land use change

ix) Human resettlement

x) Socio economic alteration

xi) Vibrations

xii) Disruption of natural landscape

3.12.3 Resettlement of affected Stakeholders

The Consultants shall prepare a comprehensive report regarding resettlement of affected stakeholders and their socio economic impact alongwith relocation plans / proposal.

3.12.4 Preparation of report as per Standard Formats of concerned agencies

The Consultant shall prepare the report(s) as per standard format of concerned Environmental Protection Agencies of Pakistan or provinces. If required Client will submit these reports to concerned agencies and also pay necessary fee, however, Consultant shall prepare reply of observations raised by concerned agencies and represent or make presentations before such agencies, where required.

3.13 Study of existing yards

The Consultant shall inspect and study all station yards in the project area and prepare a comprehensive report indicating the existing yard capacities, issues, bottlenecks and problems of yards, proposal for remodelling of yards to remove bottlenecks and make them fit for the designed speed and cater for long haul freight trains both in terms of capacity and fluidity. The Consultants shall also study the drainage of yards and provide necessary expert opinion for improvement of drainage of yards. The Consultant shall carryout feasibility level design of draiange arrangemenet alognwith cost estimate.

3.14 Study of Buildings

The Consultant shall inspect and study all station buildings and other structures/facilities related to train operation and prepare a report regarding their suitability, structural stability and sufficiency to cater for future traffic demand. The Consultant shall propose for up-gradation / improvement of existing or construction of new buildings (where required) in consultation with Client. The Consultant will also provide input about quarters / residential

buildings of staff. The Consultant shall carryout feasibility level design of buildings and prepare cost estimate.

3.15 Proposal for construction of Boundary Wall / Fencing

While carrying out track condition survey and topographic survey, the Consultant shall specifically note and point out the locations of tress passing of track. The Consultant shall also collect data / information of accidents occurred due to tress passing and prepare a comprehensive report in this regard. Based on the previous history, data collected from site and future growth of population, the Consultant shall propose construction of boundary wall / fencing at vulnerable locations(at station yards as well as in block sections). The Consultant shall carryout feasibility level design of boundary wall / fencing and prepare cost estimate.

3.16 Study for improvement / establishment of maintenance facilities for Locomotives, Carriages & Wagons.

Based on the future traffic demand, the Consultant shall assess the requirement of locomotives, carriages and wagons. The Consultant shall study the existing facilities available at various stations on the route with a view to assess their sufficiency, efficiency, togather with availability of necessary equipment and facilities. While studying the maintenance facilities the Consultant should also consider the major workshops and other facilities over entire section to be studied. The Consultant shall propose up-gradation of existing maintenance facilities and provision / construction of new facilities keeping in view the future traffic demand indicating the requirement of new buildings, addition / alteration of existing buidlings / stations and machines, tools & plants etc along with preparation of cost estimates.

3.17 Financial and Economic Analysis

3.17.1 Economic analysis

3.17.1.1 <u>Economic costs</u>

Based on the estimated costs of development and operation, the Consultant shall estimate the economic costs of the project over its 30-year project evaluation period.

In determining the economic costs for all factors in the project, the Consultant shall ensure that all such costs are net of taxes, duties or any other transfer payments to the Client and shadow prices where appropriate to reflect the true scarcity of the resources being used.

3.17.1.2 Economic benefits

The Consultant shall determine and quantify, where applicable, all the significant economic benefits of developing and operating the project over its 30-year project evaluation period.

These economic benefits shall include the following:

i) Savings in transportation costs;

ii) Reduced rail road maintenance costs;

iii) Residual value of railway infrastructure at the end of the project evaluation period;

iv) Time savings (traffic congestion relief);

v) Employment generation;

vi) Reduced rail & road accidents;

vii) Reduced emissions; etc.

viii) Others as deemed important by Consultant

Since the greatest measurable and quantifiable user benefit to be derived from the implementation of the project is "Savings in transportation costs", the Consultant shall give particular attention to its estimation.

In view of the fact that some of the economic and social benefits arising from the implementation of the project are intangible and difficult to quantify accurately, the Consultant shall undertake detailed qualitative analyses of these benefits. Only when such benefits can be firmly demonstrated in quantitative terms shall they be included in the economic analyses. In all other cases, these benefits shall not be included in the economic evaluation of the project but may be used as secondary justification for the project.

3.17.1.3 Economic evaluation

The Consultant shall evaluate the economic viability of the project over its 30-year project evaluation period. The economic viability shall be calculated using a discount rate of 12% or other rate proposed by the Consultant in consultation with the Client.

The economic viability of the project shall be expressed as:

i) Economic Internal Rate of Return (EIRR)

ii) Net present value (NPV)

iii) Cost-Benefit ratio (CBR)

The Consultant shall develop a computer based economic model for the project. The economic model output shall include the economic viability expressed as EIRR and /or NPV and/or CBR. The economic model shall enable users to specify various scenarios and to adjust the key inputs of both the operating and economic assumptions.

Using the economic model, the sensitivity of economic viability to the key assumptions and inputs shall be determined.

3.17.1.4 Financial analysis

The Consultant shall assess the financial viability of the project under the three rail traffic forecast scenarios using internationally accepted criteria.

The Consultant shall develop a computer-based financial model for the project. The financial model outputs shall include pro-forma financial statements (balance sheets, income statements, cash flow statements, etc) for every year following the commissioning of the project. The financial model shall enable users to specify various scenarios and to adjust the key inputs of both the operating and financial assumptions.

Using the financial model, the sensitivity of the important outputs to the key assumptions and inputs shall be determined. Revenues shall be calculated based on assumed rail tariffs.

The financial viability of the project shall be expressed as:

Financial Internal Rate of Return (FIRR)

3.18 Cost estimation of Up-gradation of Track and Infrastructure

The Consultant shall prepare cost estimates of all up-gradation and new works including all components like, track, embankment, bridges, fencing, signaling & telecom, maintenance facilities, buildings, utilities etc. The cost estimates shall be supported by breakup and basis of costing i.e., unit rate of various items, quantities etc.

3.19 Preparation of bankable Feasibility Study

Based on various studies the Consultant shall prepare a comprehensive Feasibility Study Report. The Feasibility Study shall be a bankable report acceptable to international financial institutions.

3.20 Provision of transport to Client

Consultant shall arrange and provide, within one month after signing of contract, a new vehicle (1000 cc) for exclusively use of client for site visits and supervision of field works. Ownership of said vehicle shall be transferred to railways at completion of the study for which Consultant will pay the transfer fee.

4 DELIVERABLES

The Consultants shall provide the following:

S. No	Description / Deliverables	Remarks
1.	Inception Report	Ten (10) copies of each report with editable Soft Copy of all Design/Planning/ Analysis Softwares working files on CD/DVD/USB
2.	Track condition survey report	
3.	Bridge Condition Survey Report including individual report or chapter for each bridge inspected in detail.	
4.	Topographic Survey Report	
5.	Hydrology Study Report	
6.	Report of study of up-gradation / conversion of Level Crossings	
7.	Report on Environmental Impact Assessment	
8.	Report on easement of sharp curves	
9.	Report for improvement of signaling and telecommunication system	
10.	Report on study of assessment of Passenger and Freight Traffic	
11.	Geotechnical study report	
12.	Report on study for provision / improvement of water supply and drainage system	
13.	Power supply study report	
14.	Report on study of yards	
15.	Report on construction of boundary wall / fencing	
16.	Financial and Economical Analysis Report	
17.	Cost Estimates	
18.	Alignment Design Report with plan and profile of final alignment	
19.	Draft Feasibility Report	
20.	Final Feasibility Report	

Study area comprises three different sections (Khanewal-Shorkot-Faislabad-Sangla Hill, Sangla Hill-Shahdara, Sangla Hill to Wazirabad various study reports to be prepared by Consultant shall comprise separate chapters for each of the above mentioned sections.

5 Mode of Payment

5.1 Currency used for payments

The Client shall make all payments to the Consultant in Pak Rupees. However, the Client shall have no objection and shall facilitate the remittance in foreign currency of the remuneration of the foreign partner to the extent of services rendered by foreign partner with regard to this consultancy assignment.

5.2 Schedule of payments

Payment shall be made as per following schedule. However, Part payment for individual study is allowed. Each Report must be duly signed by respective nominated professionals against positions shown in Data Sheet of RFP against Clause no. 2.19.1

S No.	Submission of Deliverables (Payment will be done on acceptance of Deliverable)	%age Payment
1.	Inception Report	10(Ten) %
2.	Track condition survey report	
3.	Topographic Survey, Hydrology Study & Geotechnical Study Reports	10 (Ten) %
4.	Bridge Condition Survey Report	10 (Ten) %
5.	Reports of study of up-gradation / conversion of Level Crossings, construction of boundary wall / fencing, provision / improvement of water supply and drainage system, easement of sharp curves and Report on study of yards, Environmental Impact Assessment report. and Train operation & Rolling Stock Report (part payment for each study allowed)	10 (Ten) %
6.	Reports for improvement of signalling and telecommunication system and Power supply study	5 (Five) %
7.	Report on study of assessment of Passenger and Freight Traffic	5 (Five) %

8.	Financial and Economical Analysis Report	5 (Five) %
9.	Cost Estimates	5 (Five) %
10.	Alignment Design Report with plan and profile of final alignment	5 (Five) %
11.	Draft Feasibility Report	15 (Fifteen) %
12.	Final Feasibility Report	10 (Ten) %

6 TIME FOR COMPLETION Of ASSIGNMENT

Completion Period is as mentioned in Data Sheet of RFP against clause no. 2.29, excluding 15 days required by the Client for review and submission of comments on Draft Feasibility Report to the Consultants.

7 GENERAL REQUIREMENTS

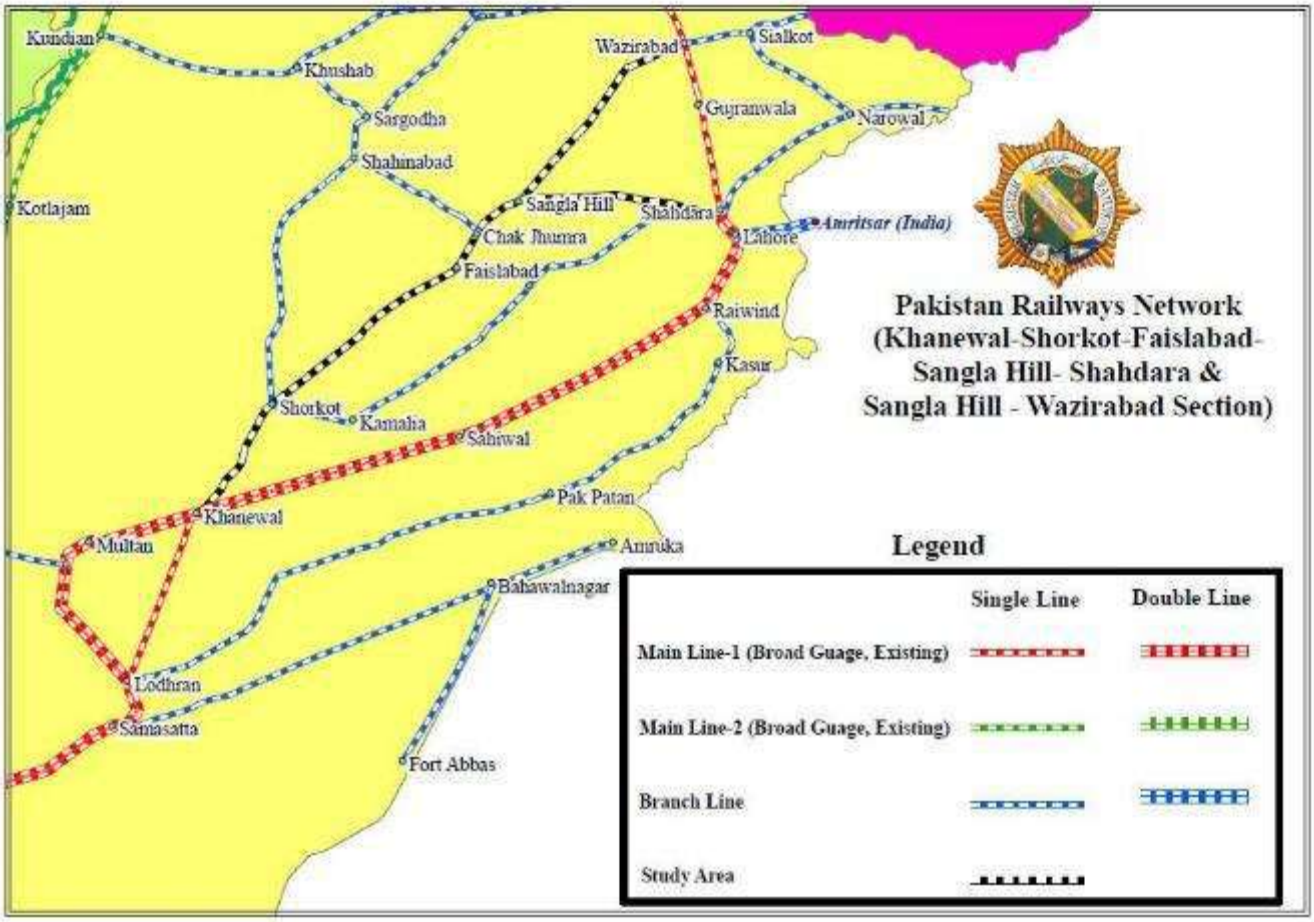
7.1 Integrity Pact

The consultant shall sign and stamp the Integrity Pact, as per Standard Format of Pakistan Engineering Council (PEC), in case contract value exceeds Pak Rs. 10.000 Million.

7.2 Registration of Foreign Firms with Pakistan Engineering Council (PEC)

The consultant shall be required to abide by the bylaws of Pakistan Engineering Council (PEC) and foreign firm should get registered with PEC after signing of the Contract Agreement.

Appendix-A : Project Area Map



Appendix-B : Design Parameters

S.No.	Parameter	Requirements as per TOR
1	Track Gauge	Broad Gauge (1676mm)
2	Track	To be decided by Consultant
3	Speed (freight)	120 km/h
4	Speed (passenger)	160 km/h
6	Axle Loading	25 Ton for overall Design and 28 Ton (HMBG Loading) for Checking and Design of Bridges.
7	Crossing Loops	To be suggested by the Consultant
8	Ruling Grade	Preferably 1:200 or as suggested by Consultant based on topography
10	Max. Horizon. Curvature	Curvature compatible with speed of 160 Km/hr & with parabolic transition
11	Rails	60 kg/m cont. welded
12	Sleepers	Pre-stressed Monoblock Concrete
13	Rail fastenings	Elastic
14	Ballast & Sub-ballast	As suggested by the Consultant
16	Main line turnouts	60 kg/m rail, suitable for 160 Km/h on concrete bearers, Crossing angle 1 in 16
17	Traction	Diesel Electric/Electric
18	Rolling Stock Type	To be suggested by the Consultant
19	Signalling	To be suggested by the Consultant
20	Level Crossings	None as far as possible, if unavoidable should be with signaling
21	Fencing	Station Yards, Populated areas or as suggested by the Consultant.

Appendix-C

SUMMARY OF BRIDGES

	Girder Bridge upto 40'	Girder Bridge over 40'	Other Bridges	Total
Khanewal-Shorkot	14	7	28	49
Shorkot-Faislabad	62	2	16	80
Sangla Hill - Wazirabad	129	4	68	201
Sangla Hill-Shahdara	67	7	62	136
Total	272	20	174	466

Note: Above information is not final and provided for guidance of Consultant. During feasibility study the consultant will be required to prepare list showing exact type, span and location of all bridges.