



**COMMUNICATION & WORKS DEPARTMENT
GOVERNMENT OF THE PUNJAB**

HIGHWAY M&E

**PC-II
for
Outsourcing of Quality Control Regime**

G.Sr.No.3212 (ADP 2022-23)

**Punjab Monitoring & Evaluation (M&E)
Department.**

PC-II

Outsourcing of Quality Control Regime

1	Name by which the survey / study shall be identified.	Out sourcing of Quality Control Regime
2.	Administrative Authorities Responsible for :-	
a	Sponsoring	Government of the Punjab
b	Executing	C& W Department - Punjab
c	Operation	Punjab Monitoring & Evaluation Department
3	Central Ministry Concerned with:-	
a	Sponsoring	Not Applicable
b	Executing	Not Applicable
4	Details of survey and Feasibility Studies:-	
a)	General Description / Justification	Communication & Works Department, Government of the Punjab intends to Outsource the quality control of roads being constructed under the management of the department pertaining to road rehabilitation program in ADP, schemes of ADP 2022-23 and Road Rehabilitation Block scheme in ADP. The assignment consists of quality assurance and rectification proposals as required. Prime object is to ensure better quality roads.
b)	Justification	The quality control of newly constructed roads through conventional procedures of contracting will add to verification of the

quality of works by outsourced independent third parties. This will prove to enhance the quality work of roads of the province.

This process will be beneficial for making maximum use of the money spent on construction of projects to ensure that high quality of works justifies the funds to be used for outsourcing the quality control regime.

Apart from better usage of funds, the commuters will be provided with durable long lasting and smoother means of travelling.

c) Terms of Reference (TOR)

P&D Board vide letter No. 6-118/AC(M)P&D/2022-23 dated 04.07.2022 directed that robust quality control mechanism should be put in place by the administrative department.

The Terms of Reference (TOR), in general, are envisaged to be as follows:

Quality control of construction works

The quality control consultants will execute the testing of pavement structure of road.

The samples collected from field pits will be tested for materials in renowned laboratories e.g. UETs, BZU, RR&MTI and SGS etc. For structures, the execution of design will be verified by visual inspection of structure experts as well as by non destructive testing for concrete and steel used in structures. The remaining parts of the project will be inspected and checked

in field as per standards and specifications of the project. The Consultants will also review and verify last IPCs at the time of visit and Non Conformance Reports (NCR) generated by Resident Consultants.

Deliverables:

1. Inception report
2. Work Schedule & Methodology
3. Mobilization of field staff
4. Preliminary Quality Control Report
5. Final Quality Control Report

Mode of Payment:

1 st Payment upon signing of agreement	10%
Upon Submission of Inception report	10%
Submission of work schedule & methodology	10%
Mobilization of Staff	20%
Preliminary Report	40%
Final Report	10%

d) Implementation Period

(12) Twelve month (or as mutually agreed by the parties)

e) Estimated Cost (Rs. in million)

i Local Cost

Rs. 300 Million

ii Foreign Cost

Nil

iii Total Cost

Rs. 300 Million

f) Personal Required

Core Team shall be as under:

1. Team Leader
2. Senior Civil Engineer (Roads & Bridges)
3. Material Engineer
4. Junior Civil Engineer
5. Quantity Surveyor / Lab Technician

	6. Project Coordinator
g) Equipment's	As per site requirement
i) <u>Mode of financing.</u>	Government of the Punjab
Give Budget Provision	
j) If Foreign Exchange is involved.	-----
Indicate whether a Firm Commitment is available.	
k) Details of Scheme likely to be submitted after survey and studies are completed.	N.A
i General Description	
ii Location	Punjab Province
iii Estimated Cost	---
iv Benefits of the projects Economic, Financial and Non-Quantifiable.	It will enhance quality of construction works & result in better usage of Govt. Funds.
5. Details of Scheme likely to be submitted after survey and studies are completed.	
i. General Description	Outsourcing of Quality Control Regime (Roads)
ii. Location	Punjab
iii. Benefits of the projects Economic, Financial and Non-Quantifiable.	It will enhance quality of construction works & result in better usage of Govt. Funds.
iv. Probable mode of Financing	By Punjab Government.
v. No. of the persons likely to be employed during implementation of the scheme and after completion.	
a. Local Personnel	NA
b. Foreign Personnel	Nil

- vi. Material and parts required yearly after completion of the project. NA

Prepared By:

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Reviewed By:

Director,
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Department, Lahore.

Recommended By:

Chief Engineer,
Punjab Monitoring & Evaluation (M&E)
Department, Lahore.

Approved By:

Secretary
C&W Department
Government of the Punjab

BREAK UP OF COST

Outsourcing of Quality Control Regime for Roads of Punjab Province

BREAK UP OF COST

Quality control for Road construction works	Rs. 300 Million
Total Cost	Rs. 300 Million

COST ESTIMATE

Sr. No.	Description	Unit	Cost of One (01) Test			Cost of (4100) Test	
			Qty.	Rate (Rs)	Amount (Rs)	Qty.	Amount (Rs)
A	FIELD INVESTIGATIONS						
	Asphalt Layers						
1	Taking Cores from Bituminous Pavement by Core Cutting Machine	No.	1	800	800		
2	Taking Bituminous Mix Sample from Pavement	No.	1	1,000	1,000		
	Granular Layers/Embankment						
3	Performance of field density tests by sand replacement method in test pits generally @ three (03) to four (04) tests per pit at locations selected by Client's Representative (38 Nos.) on existing road at base course, sub-base and sub-grade level. Sampling includes labeling, packing, storage and transportation to an approved testing laboratory.	No.	1	1,100	1,100		

4	Collection of composite samples (at least 60 kg. from base course, sub-base and sub-grade, including their labeling, packing, storage and transportation to an approved testing laboratory.	No.	1	600	600		
Total (A) =					3,500	4,100	14,350,000
Concrete Structures							
5	Taking Cores from Structures (AASHTO T -24)	No.	1	4,000	4,000		
B	LABORATORY TESTING (Asphalt Layers)						
1	Bitumen Extraction and Gradation (AASHTO T-164)	No.	1	10,000	10,000		
2	Marshal Stability Test (AASHTO T-245)	No.	1	9,000	9,000		
3	Void Analysis (AASHTO T-269)	No.	1	1,000	1,000		
4	In-situ Compaction of Asphalt layers By Coring Method (AASHTO T-230)	No.	1	300	300		
	LABORATORY TESTING (Embankment/Granular Layers)						
1	Sieve Analysis. AASHTO T-27 (WBM/Aggregate Base Course, Subbase, Subgrade.	No.	1	2,000	2,000		

2	Liquid and Plastic Limit. (AASHTO T-89&90) (Subgrade, Subbase)	No.	1	500	500		
3	Modified Proctor Test. (AASHTO T-180) (Aggregate Base Course, Subbase, Subgrade,)	No.	1	3,000	3,000		
4	3 Point CBR Test. (AASHTO T-193) (Aggregate Base Course, Subbase & Subgrade)	No.	1	4,000	4,000		
5	Determination of Organic Matter (AASHTO T-267) Subgrade	No.	1	1,000	1,000		
6	Sand Equivalent Value (AASHTO T-176) Fines of Aggregate Base Course and Subbase.	No.	1	2,000	2,000		
7	Los Angeles Abrasion Test (AASHTO T-104) (Asphalt Base Course, Asphalt Wearing Course, WBM, Aggregate Base Course)	No.	1	5,000	5,000		
	Total (B) =				41,800	4,100	171,380,000
C	Concrete Structures						
1	Checking Compressive Strength by Schmidt Hammer	No.	1	3,000	3,000		
2	Cement Content of Hardened Concrete	No.	1	10,000	10,000		
	Complete Report Writing	No.	1	15,000	15,000		
	Total (C)=				28,000	4,100	114,800,000

	Total (A+B+C) =	73,300		300,530,00 0
	Say Total (A+B+C) =			300,000,00 0

NOTE: Cost of tests is inclusive of remuneration & mobility cost

BILL OF QUANTITIES

Sr. No.	Description	Unit	Cost of One (01) Test			Cost of (4100) Tests	
			Qty.	Rate (Rs)	Amount (Rs)	Qty.	Amount (Rs)
A	FIELD INVESTIGATIONS						
	Asphalt Layers						
1	Taking Cores from Bituminous Pavement by Core Cutting Machine	No.	1	800			
2	Taking Bituminous Mix Sample from Pavement	No.	1	1,000			
	Granular Layers/Embankment						
3	Performance of field density tests by sand replacement method in test pits generally @ three (03) to four (04) tests per pit at locations selected by Client's Representative (38 Nos.) on existing road at base course, sub-base and sub-grade level. Sampling includes labeling, packing, storage and transportation to an approved testing laboratory.	No.	1	1,100			

4	Collection of composite samples (at least 60 kg. from base course, sub-base and sub-grade, including their labeling, packing, storage and transportation to an approved testing laboratory.	No.	1	600			
	Total (A) =					4,100	
	Concrete Structures						
5	Taking Cores from Structures (AASHTO T -24)	No.	1	4,000			
B	LABORATORY TESTING (Asphalt Layers)						
1	Bitumen Extraction and Gradation (AASHTO T-164)	No.	1	10,000			
2	Marshal Stability Test (AASHTO T-245)	No.	1	9,000			
3	Void Analysis (AASHTO T-269)	No.	1	1,000			
4	In-situ Compaction of Asphalt layers By Coring Method (AASHTO T-230)	No.	1	300			
	LABORATORY TESTING (Embankment/Granular Layers)						
1	Sieve Analysis. AASHTO T-27 (WBM/Aggregate Base Course, Subbase, Subgrade.	No.	1	2,000			

2	Liquid and Plastic Limit. (AASHTO T-89&90) (Subgrade, Subbase)	No.	1	500			
3	Modified Proctor Test. (AASHTO T-180) (Aggregate Base Course, Subbase, Subgrade,)	No.	1	3,000			
4	3 Point CBR Test. (AASHTO T-193) (Aggregate Base Course, Subbase & Subgrade)	No.	1	4,000			
5	Determination of Organic Matter (AASHTO T-267) Subgrade	No.	1	1,000			
6	Sand Equivalent Value (AASHTO T-176) Fines of Aggregate Base Course and Subbase.	No.	1	2,000			
7	Los Angeles Abrasion Test (AASHTO T-104) (Asphalt Base Course, Asphalt Wearing Course, WBM, Aggregate Base Course)	No.	1	5,000			
				Total (B) =		4,100	
C	Concrete Structures						
1	Checking Compressive Strength by Schmidt Hammer	No.	1	3,000			
2	Cement Content of Hardened Concrete	No.	1	10,000			
	Complete Report Writing	No.	1	15,000			

NOTE: Cost of tests is inclusive of remuneration & mobility cost

Term of Reference (TOR)

1. SCOPE, DUTIES AND RESPONSIBILITIES OF THE CONSULTANT

The scope, duties and responsibilities of the Consultants will include but not necessarily be limited to the following:

- i. The Consultants will prepare a comprehensive and logical work plan and present to the Chief Engineer, Punjab Monitoring & Evaluation (M&E) Department in the form of an Inception Report for review and approval and subsequent implementation. Chief Engineer, Punjab Monitoring & Evaluation (M&E) Department will review the same and approve accordingly within seven (07) days.
- ii. The Consultants shall conduct quality control on:
 - a) 100% of 149 roads under the sub type “Road Rehabilitation Program” included in ADP 2022-23 as new schemes.
 - b) Randomly selected 10% of roads in each Administrative Division to be taken up under scheme titled “Road Rehabilitation Programme” reflected at G.Sr.No.4984 of ADP 2022-23.
 - c) Randomly selected 10% of new schemes in the normal ADP of roads.
- iii. The required quality and quantity of Technical / Core Team of Consultants (As per requirements defined in Table 3) will be engaged by Consultants as per TORs. The presence of Consultant’s field staff may be randomly checked by the office of Chief Engineer, Punjab Monitoring & Evaluation (M&E) Department at anytime.
- iv. Technical / Core Team of Consultants (As per requirements defined in Table 3) is required to work in coordination and collaboration with the Staff of C&W Department, or other line department / executing agency of the scheme and office of the Chief Engineer, Punjab Monitoring & Evaluation (M&E) Department to provide services pertaining to the project.
- v. The Consultants will establish an office with all requisite equipment, machinery, computers and printer sets etc. and to ensure their presence as are required for satisfactory completion of the project.
- vi. In case of rigid pavement, standard test of rigid pavement will be

conducted by the Consultants to validate quality of work.

- vii. The Consultants will analyze and validate the quality of rehabilitated / newly constructed roads as per specifications at substantial completion of every layer. Additional field / Lab tests shall be conducted under the directions of the Client as and when required.
- viii. The Consultants will upload the status on the web portal / dashboard on daily basis.
- ix. Pictorial evidence of work will be uploaded by the Consultants on daily basis on each site visit, against their work plan, on the web dashboard / android based system, so that the comparison of pre and post rehabilitation and construction works can be observed by the concerned stakeholders.
- x. Detail report will be submitted in soft and hard form to Chief Engineer, Punjab Monitoring & Evaluation (M&E) Department on monthly basis.
- xi. Lab testing will be conducted by the Consultants at substantial completion of Sub Grade, Sub-Base, Base and Asphalt Wearing Course, so that the rectification can be made at the appropriate time. Test of structures / culverts /bridges pertaining to the roads will be conducted. Deep testing will be conducted up to the level of Base Course at those places where Sub Grade, Sub Base and Base Course tests failed earlier to confirm the quality status of any of the previous road layers.
- xii. The suitable facility of the conducting field testing and lab testing as per AASHTO / ASTM / BS will be arranged / owned by the Consultants and they will be responsible for testing results at any level / forum.
- xiii. Consultants will conduct all testing on all the roads / bridges as per TORs regardless of the kind of work i.e. new construction, rehabilitation works, road widening, overlay etc.
- xiv. Consultants shall:
 - a) Verify location of roads / bridges as per decided locations and record GPS Coordinates.
 - b) Verify of road / bridge width, length and cross section

- c) Verify road / bridge furniture
 - d) Verify all concrete structures as per design
 - e) Validate complete scope of work as per PC-I
 - f) Highlight road and concrete structures related issues supported with pictorial evidences along with plausible solutions.
 - g) Measure effectiveness of the role of the Resident Supervision Consultants.
- xv. The Consultant shall ensure that works have been executed according to the drawings and specifications.
- xvi. The Consultant shall report the problems of potential nature which might arise in connection with the quality of construction.

2. LIMITATION

- i. To avert conflict of interest, only those Consulting Firms will be entitled to apply, which are not engaged as Resident Supervision Consultants / Design Consultant by C&W Department in the Road Rehabilitation Programme in the concerned zone of Punjab Highways Department where the firm intends to apply as consultant. The selected Consultants will furnish a certificate to this effect before entering into the agreement.
- ii. For each zone of Punjab Highways Department, a Project Coordinator will be appointed by the selected Consultant for coordination and contract administration.

3. WORKING LANGUAGE

Working language will be English.

4. QUALITY CONTROL ROAD / BRIDGE TESTS

The Consultant in each zone will conduct requisite quality control tests to validate rehabilitation / construction works or quality of rehabilitation work at execution or completion stage of work.

Table 1: Detail of Tests to be conducted on project sites and in Laboratory

Sr. No.	Description
A	FIELD INVESTIGATIONS

	Asphalt Layers
1	Taking Cores from Bituminous Pavement by Core Cutting Machine
2	Taking Bituminous Mix Sample from Pavement
	Granular Layers/Embankment
3	Performance of field density tests by sand replacement method in test pits generally @ three (03) to four (04) tests per pit at locations selected by Client's Representative (38 Nos.) on existing road at base course, sub-base and sub-grade level. Sampling includes labeling, packing, storage and transportation to an approved testing laboratory.
4	Collection of composite samples (at least 60 kg. from base course, sub-base and sub-grade, including their labeling, packing, storage and transportation to an approved testing laboratory.
	Concrete Structures
5	Taking Cores from Structures (AASHTO T -24)
B	LABORATORY TESTING (Asphalt Layers)
1	Bitumen Extraction and Gradation (AASHTO T-164)
2	Marshal Stability Test (AASHTO T-245)
3	Void Analysis (AASHTO T-269)
4	In-situ Compaction of Asphalt layers By Coring Method (AASHTO T-230)
	LABORATORY TESTING (Embankment/Granular Layers)
1	Sieve Analysis. AASHTO T-27 (WBM/Aggregate Base Course, Subbase, Subgrade.
2	Liquid and Plastic Limit. (AASHTO T-89&90) (Subgrade, Subbase)
3	Modified Proctor Test. (AASHTO T-180) (Aggregate Base Course, Subbase, Subgrade,)
4	3 Point CBR Test. (AASHTO T-193) (Aggregate Base Course, Subbase & Subgrade)
5	Determination of Organic Matter (AASHTO T-267) Subgrade

6	Sand Equivalent Value (AASHTO T-176) Fines of Aggregate Base Course and Subbase.
7	Los Angeles Abrasion Test (AASHTO T-104) (Asphalt Base Course, Asphalt Wearing Course, WBM, Aggregate Base Course)
C	Concrete Structures
1	Checking Compressive Strength by Schmidt Hammer
2	Cement Content of Hardened Concrete

Note:

1. The consultants will conduct all testing on all the selected roads as per TORs regardless of the kind of road i.e. new construction, rehabilitation works, road widening, overlay etc.
2. The Consultants will perform compaction tests on shoulders on both sides of main carriageway as part and parcel of main carriageway testing with the same cost.
3. The Consultants will perform retests where tests have been reported to have failed.

4.1. FREQUENCY OF ROAD & BRIDGE TESTS

Road tests will be performed with the following frequencies depending on the length of roads (Annexure - A) as mentioned in Table 2.

Table 2: Frequency of tests to be conducted on selected roads

Sr. No.	Road Length	No. of sets per Road
1	0-7.5 km	3 Sets
2	7.5-10 km	4 Sets
3	10-15 km	5 sets
4	>15 km	7 sets

5. CORE TEAM OF EXPERTS REQUIRED

For each zone of Punjab Highways Department, Consultant team will be composed of staff as categorized below in Table 3.

Table 3: Detail of human resource required by Consultants

Sr. No.	Position	Qualification	Experience	No.	Manpower (Months)
1	Team Leader	MSc (Geo tech Engineering) / B.Sc. in Civil / highway Engineering	For 18 Years of Education: 10 years of relevant experience in the field of Roads /Highways For 16 Years of Education: 12 Years of relevant experience in the field of Roads /Highways	1	10
2	Senior Civil Engineer (Roads & Bridges)	MSc (Geo tech Engineering) / B.Sc. in Civil / highway Engineering	For 18 Years of Education: 5years of relevant experience in the field of Roads / Highways For 16 Years of Education: 7 Years of relevant experience in the field of Roads / Highways	1	10
3	Material Engineer	MSc / B.Sc. in Civil Engineering or in Geology Or Geological Engineering	For 18 Years of Education: 5years of relevant experience in the field of Roads / Highways Testing For 16 Years of Education: 7 Years of relevant experience in	1	10

			the field of Roads / Highways Testing		
4	Junior Civil Engineer	B.Sc.in Civil Engineering	3 years of relevant experience in the field of Roads /Highways with PEC registration	3	10
5	Quantity Surveyor / Lab Technician	DAE in Civil Technology/ Diploma or certificate in Lab Technician	5 years of relevant experience in the field of Roads Testing /Highways	10	10
6	Project Coordinator	Graduation / BSc Civil Engineering	3 years relevant experience	1	10
Total				17	

6. TIME DURATION

Job will be completed within twelve (12) Months after signing the agreement.

7. LAB TESTING SOLUTIONS

- i. The selected Consultants will own / arrange requisite testing facility recognized by the Government of Punjab or approved by the Chief Engineer, Punjab Monitoring & Evaluation (M&E) Department to conduct designated number of tests as per mentioned specification within described timelines.
- ii. Consultants will upload the results on web dashboard / android based system along with the road ID besides date and time on which sample for test is collected.
- iii. Consultants will also be responsible for their test results / quality of test at any forum as required.
- iv. Consultants will ensure to complete all the road tests before final completion of respective road.

8. INDIRECT COST

Reasonable indirect costs such as one residence cum office for their appointed staff, one vehicle for site visits (Vehicle may be on rental basis along with provision of petrol, driver and maintenance charges (if any), expenditure such as Office Equipment (Computer Hardware & Software), Printing, Publication & Communication, and other misc. (Labor work i.e., office boy, data entry operator, etc.), will be included in cost of tests by the Consultant as per agreed terms and conditions.

9. COST OF TESTING

Cost of testing of various quality tests to be performed by Consultants will be determined by multiplying the rate of each test proposed by the Consultant multiplied with the total number of tests. Retest will be paid according to rate of the tests of contract agreement.

10. FINANCIAL PROPOSAL OF CONSULTANT

Consultants will submit single financial proposal of the job against TORs inclusive of direct and indirect costs inclusive of all applicable govt. taxes.

Proposal should also include all related cost to the human resource, travelling and accommodation, boarding and lodging, local communication, drafting, printing and reporting, labor work and testing cost. Lab / Field Testing cost will be determined by the consultant in accordance with the actual test performed. If extra tests are to be conducted by the Consultant on the directions of the client, the cost of such test will be reimbursed accordingly on the given rate of the Consultants.

11. DELIVERABLES, PAYMENT AND TIMELINE

The Consultants shall submit final report for each project of Third Party Validation of the assignment as per following schedule:-

1 st Payment upon signing of agreement	10%
Upon Submission of Inception report	10%
Submission of work schedule & methodology	10%
Mobilization of Staff	20%
Preliminary Report	40%
Final Report	10%

Note: The Consultants will also submit monthly progress report to Office of Chief Engineer, Punjab Monitoring & Evaluation (M&E) Department. Moreover, Consultant will prepare separate sample draft Report for each project and get it approved from this office and then, accordingly will prepare all the Reports.

Payment will be made to the Consultants after deducting all the applicable taxes levied at the time of payment.

12. PROFESSIONAL LIABILITY OF THE CONSULTANTS

Professional Liability of the Consultants shall be observed under the provisions of Punjab Procurement Rules-2014.
