System improvement in connection with PCC/RCC/PSC Works (Authority: - SDGM/SER's letter No. Vig./Sys Improvement/2512, dated. 21.09.2023.)

12.20.1 **Method Statement for Execution of Works**: The contractor shall submit, within 21 days of the receipt ofthe Letter of Acceptance, Method statements supported with Bar Chart as listed below considered as a minimum. The contractor shall submit, in addition, all Method Statements he considers as necessary to explain in sufficient details his approach in executing the contractual works and meeting all deadlines as required in the Government Requirements. The Method Statements shall describe and explain in sufficient detail how the Contractor wants to execute the different parts of the works to meet the contractual requirements. The Agency should adopt all improved mechanization process in works for speedy progress of work at agency's own interest.

- Soil Investigation
- Site Installation, Mobilization and Demobilization
- Earthworks and Blanketing works
- Formwork and Scaffolding
- Concrete Works (Bridges, Culverts, Subways etc.)
- Bridge girder assembly and launching
- Structural Steelworks
- Track Works
- Project Management, Project Organization, Project Control
- Quality Management and Quality Control.

12.20.2 **Quality Assurance Plan (QAP): For works costing above 8 Cr.,** within 21 days of receipt of letter of acceptance, the contractor shall submit the Quality Assurance Plan in sufficient details covering major items of the contract for approval of Engineer.

(A) The contractor shall establish a Quality Control Mechanism, Quality Assurance Plan (the "Quality Assurance Plan" or "QAP"), Material Testing Plan (the "Material Testing Plan" or "MTP") and Method Statements for execution of works (the "Method Statements" or "MS") in consultation of Railway Engineer.
(B) The contractor shall, within 21 (Twenty-one) days of the issue of LOA, submit to the Railway Engineer its Quality Control Mechanism, QAP, MTP and MS which shall include the following:
(i) Organization, duties and responsibilities, procedures, inspections and documentation;
(ii) Quality control mechanism including sampling and testing of Materials, tests required during the execution of works and frequencies by contractor and Railway Engineer or its representatives, standards, acceptance criteria, testing facilities, reporting, recording and interpretation of test results, approvals, check list for site activities, and proforma for testing and calibration in accordance with the Specifications and Standards and Good Industry Practice; and
(C) The contractor shall carry out internal audits of the Quality management System regularly, and at least once every 6 months. The contractor shall submit to the Engineer a report listing the results of each internal audit within 7 days of completion. Each report shall include, where appropriate, the proposed measures to improve and/or rectify the Quality Management System and/or its implementation.
(D) The Railway Engineer shall convey its comments to the contractor within a period of 21 (twenty-one) days of receipt of the QAP stating the modifications, if any, required, and the contractor shall incorporate those in the QAP to the extent required.
(E) The contractor shall procure all documents, apparatus and instruments, fuel, consumables, water, electricity, labour, Materials, samples, and qualified personnel as are necessary for examining and testing the Project Assets, Materials and workmanship in accordance with the Quality Assurance Plan.
(F) The cost of testing of Construction, Materials and workmanship under this Article shall be borne by the contractor.
Note: All the cost will be borne by the contractor. No extra payment shall be made for this by Railway.

12.20.3 **Establishing Laboratory at Site: In all tenders costing more than 10 Cr.** Above contractor shall construct site laboratory with adequate furnishings and fixtures to do various tests on soil, aggregates, concrete, reinforcement, water, cement etc. The site laboratory should have adequate space to accommodate all required equipments for various tests related to the contract. Minimum equipments required for this work are as below:

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Date: 2025.04.21 18:33:10 IST
Reason: IREPS-CRIS
Location: New Delhi

List of Laboratory Equipment -

Sl. No.	DESCRIPTION OF EQUIPMENT	Unit
A.	**EARTH WORK.**	
(a)	IS set of sieves sizes 20mm, 19mm, 10mm, 4.75mm, 2 mm 600 mic, 425 mic., 212 mic., 75 mic. with base & top lid	2 Sets
(b)	Hand operated sieve shaker for above sieves	1 No
(c)	BALANCE	
	a) Pan balance 10 Kg. Capacity (with 1.0 gm Least Count).	1 No.
	b) Electronic balance 500 gm capacity (with 0.1 gm Least Count).	1No.
(d)	Field density apparatus complete.	
	a) Sand replacement.	2 Sets.
	b) Core cutter with dolly	5 Sets.
(e)	Modified heavy Proctor density apparatus full unit.	2 Sets
(f)	Liquid Limit apparatus hand operated with counter & grooving tools.	2 Sets
(g)	Shrinkage limit apparatus	1 No.
(h)	Stainless steel spatula - 25cm long	2 Nos.
(i)	Porcelain bowl for LL - 15cm dia.	3 Nos.
(j)	Aluminum dish with lid – 5cm dia.	4 Nos.
(k)	Wash bottle - 1 lit. capacity 500ml capacity	6 Nos.
(l)	Glass plate 10mm thick 50x50 cm	2 Nos.
(m)	Ground glass 5mm thick 50x50 cm	2 Nos.
(n)	a) Enameled trays 45x30cm	3 Nos.
	b) Enameled trays 20x20cm	3 Nos.
(o)	a) Enameled plates 6 inch dia	10 Nos.
	b) Enameled plates 8 inch dia.	10 Nos.
	c) Enameled plates 10 inch dia.	10 Nos.
(p)	Frying pans	3 Nos.
(q)	Stove janta	2 Nos.
(r)	Straight edge 300mm long	3 Nos.
(s)	Grain size analyser of fines a) Hydrometer	2 Nos.
	Grain size analyser of fines b)Thermometer 0 to 50 c	2 Nos.
	Grain size analyser of fines c) Glass cylinder 1000cc capacity with 60mm dia.	5 Nos.
(t)	Desiccators as IS –6128	2 Nos.
(u)	Can of 10 litre capacity for distilled waterWooden mortar and pestle.	3 Nos
(v)	Specific gravity test apparatus.	1 No.
(w)	Density bottle-50ml capacity Glass cylinder 100 cc capacity (for l Free Swell index test)	2 Nos.
(x)	Oven- thermostatically controlled to maintain a temperature 105-110c	2Nos.
(y)	Consumable Item - (a) Sieve brush	1 No.
	(b)Wire brush	
	(c) Sodium carbonate	
	(d) Sodium hexa meta phosphate.	
	(e) Kerosene	
	(f) Mercury	
	(g) Additional Equipment -Hand auger 150mm dia with extension rod.	
	(h) Sampling tube 100mm dia. And 450mm length	
B.	**CONCRETE WORKS**	
(a)	Cube Moulds of adequate numbers & sizes	45
(b)	Slump Test Apparatus with all accessories.	12
(c)	Marsh Cone.	1
(d)	Pycnometer 1 ltr.	3

(e)	Pycnometer 500 ml.	3
(f)	Flakiness and Elongation Gauges each one	2
(g)	Aggregate impact Value Test Apparatus including all accessories.	1
(h)	Bulk density set.	1
(i)	Density Basket	1
(j)	Sieves 450 mm internal dia confirming to IS: 460 of size varying 2.36mm to 80.00mm	0
(k)	Lid & Pan.	2
(l)	Brass Sieves 200 mm internal dia confirming to IS: 460 of size varying 45 Microns to 4.75mm	0
(m)	Lid & Pan	3
(n)	System for measuring water penetration in six concrete samples. Complete with required compressor, constant pressure arrangement, tubing and leak proof clamping arrangement as per DIN1048 Specifications. Constant pressure to be maintained during the test.	3
(o)	Crushing Valve.	1
(p)	Standard Weight Set for calibration of balances.	2
(q)	Steel Scoop Small	3
(r)	Oven for moisture content weights as required for various tests including moisture content.	1
(s)	Permeability test arrangement	Applicable only in caseof Major Bridges
(t)	Compressive strength testing machine	
(u)	Equipment for detecting density of Bentonite	
(v)	Equipment for detecting Marsh cone viscosity of Bentonite	
(w)	Equipment for detecting pH value of Bentonite	
(x)	Equipment for detecting Sand Content of Bentonite	
(y)	Equipment for detecting Liquid Limit of Bentonite	
(z)	Equipment for Load transfer test	
(z) (a)	Static load test with tendon – anchorage assembly	

Note: (1) The above list of equipments is indicative only. The same may vary as per the actual requirement as decidedby the Engineer-in-Charge.

(2) The contractor shall setup the lab and should be made available and functional in two months from the date of issue of LOA or the physical commencement of the work at site, whichever is later, failing which a penalty of Rs.5000/- per day shall be imposed.

(3) All the cost will be borne by the contractor. No extra payment shall be made for this by Railway.