SCHEDULE – "A" SE(PW-II)

3rd PARTY QUALITY CONTROL SCHEDULE FOR GVMC WORKS

Name of the Work: - Third party quality control system to Executive Engineer works in Zone-V & Zone-VI Civil works and Mechanical & Electrical and procurement of supplies / spares costing above one lakh executed by Greater Visakhapatnam Municipal Corporation for one Year

1. GENERAL CONDITIONS OF CONTRACT

1. GENERAL PROVISIONS

1.1 Definitions

Unless the context otherwise requires, the following terms whenever used in the Contract have the following meanings:

a. "Applicable Law" means the laws of India and the state of Andhra Pradesh and Greater Visakhapatnam Municipal Corporation, VSP.
b. "Contract" means the Contract signed by the Parties, to which these General conditions of Contract (GC) are attached, together with all the documents listed in Clause I of such signed Contract:
c. "GC" means these General Conditions of Contract:
d. "Government" means the Government of India or Government of Andhra Pradesh as appropriate to the context;
e. "Local currency" means India Rupees;
f. "Party" means the Client or the Consultants, as the case may be, and Parties means both of them;
g. "Personnel" means persons hired by the Consultants or by any Sub consultant as employees and assigned to the performance of the Services or any part thereof;
h. "SC" means the Special Conditions of Contract by which these General Conditions of Contract may be amended or supplemented;
i. "Services" means the work to be performed by the Consultants pursuant to this Contract as described in the clause 3.0 of SC;

1.2 Law Governing the Contract:

This Contract, its meaning and interpretation, and the relation between the Parties shall be governed by the Applicable Law.

1.3 Language - English

1.4 Notices

Any notice, request or consent made pursuant to this Contract shall be in writing and shall be deemed to have been made when delivered in person to an authorized representative of the party to whom the communication is addressed as indicated in the agreement.

1.5 Authorized Representatives

Any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Client or the Consultants shall be taken or executed by the authorized representative of consultant.

2.0 COMMENCEMENTS, COMPLETION, MODIFICATION AND TERMINATION OF CONTRACT

2.1 Commencement of Services

The consultants shall begin carrying out the Services immediately after issue of work order or signing the contract.

2.2 Modification

Modification of the terms and conditions of this Contract, including any modification of the scope of the Services or of the Contract Price, may only be made by written agreement between the client and consultant.

2.3 Force Majeure

2.3.1 The terms and conditions mutually agreed upon this CONTRACT shall be subject to Force Majeure.

2.3.2 Neither Greater Visakhapatnam Municipal Corporation nor the Consultant shall be considered in default in the performance of its obligations hereunder for such period, if such performance is prevented or delayed because of war, hostilities, revolution, civil commotion, general strike, epidemic, accident, fire, wind, floor, earthquake or because of any law or order proclamation, regulation or ordinance by any Government or of any sub division thereof or an order by Court of Law, any act of God and State or any other cause whether of similar or dissimilar nature beyond the reasonable control of the party affected.

2.3.3 Should one or both the PARTIES be prevented from fulfilling their contractual obligations by a state of Force Majeure lasting continuously for a period of one month, the parties shall consult with each other regarding future implications of the CONTRACT.

2.3.4 In the event of Force Majeure both parties shall put in their best efforts towards resumption of the works at the earliest and shall put in their best efforts towards mitigating the costs incurred by the other party.

2.4 Termination

2.4.1 By the Client

The Client may terminate this Contract, by not less than thirty (30) days written notice of termination to the Consultants, to be given after the occurrence of any of the events specified in paragraphs (a) through (d)

a. If the Consultants do not remedy a failure in the performance of their obligations under the Contract, within thirty (30) days of receipt after being notified or within such further period as the Client may have subsequently approved in writing:

b. If the Consultants become insolvent or bankrupt;

c. If, as the result of Force Majeure, the Consultants are unable to perform a material portion of the Services for a period of not less than thirty (30) days;

For the purpose of this clause:

"Corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the selection process or in contract execution.

"fraudulent practice" means a misrepresentation of facts in order to influence a selection process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among consultants (prior to or after submission of proposals) designed to establish prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.

2.4.2 By the Consultants

The consultants may terminate this Contract, by not less than thirty (30) days written notice to the Client, such notice to be given after the occurrence of any of the events specified below;

If, as the result of Force Majeure, the Consultants are unable to perform a material portion of the Services for a period of not less than thirty (30) days.

3.0 OBLIGATIONS OF THE CONSULTANTS

3.1 GENERAL

The Consultant shall perform the Third Party Quality Assurance Services for all works costing more than Rs. 1.00 lakhs or as specified by the client, for civil, Mechanical & Electrical.

The Consultants shall perform the Services and carry out their obligations hereunder with all due diligence, efficiency and economy, in accordance with generally accepted professional techniques and practices, and shall observe sound management practices, and employ appropriate methods. The Consultants shall always act, in respect of any matter relating to this Contract or to the Services, as faithful advisers to the Client.

The Consultant shall take all steps to take action in accordance with the Agreement of works contract between Municipal Corporation and works contractor.

3.2 Conflict of Interests

The consultancy fee of the Consultants pursuant to Clause 5 shall constitute the Consultants' sole consultancy fee in connection with this Contract or the Services, and the Consultants shall not accept for their own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Contract or to the Services or in the discharge of their obligations under the Contract.

3.3 Confidentiality

The Consultants and the Personnel of either of them shall not, either during the term or within one (1) year after the expiration of this Contract, disclose any proprietary or confidential information relating to the project, the Services, this Contract, or the Client's business or operations without the prior written consent of the Client.

3.4 Consultant's actions Requiring Client's Prior Approval

The Consultant has to obtain prior approval from the client

i. For conducting special tests at any recognized laboratories at no extra cost and owning the responsibility for the correctness of the report.

ii. For engaging any retired / in service Government engineers of Andhra Pradesh

3.5 Reporting system

The Consultants shall submit the test reports with their remarks directly to the Clients on weekly basis as per TOR. The Consultant would collect the information from the project site through detailed formats by carrying out relevant tests and base information along with data will be submitted to the Commissioner and forward the same to the Superintending Engineer and concerned Executive Engineer. All the information, work wise, would be documented in a register.

3.6 Documents Prepared by the Consultants will be the Property of the Client

All plants, drawings, specifications, designs, reports and other documents submitted by the Consultants would remain the property of the Client.

4.0 CONSULTANTS PERSONNEL

As per the terms of reference adequate manpower would be deputed on the project site to carryout necessary tests and preparation of reports. The consultant would depute adequate manpower and other resources at respective locations based on workload and specific requirement. All the liabilities of manpower working on the project would be with consultant.

5.0 PAYMENTS TO THE CONSULTANTS

The payment to the consultant is inclusive of I.T @ 10%,

6.0 SETTLEMENT OF DISPUTES

Any dispute arising out of this contract, which amicably not settled between the parties, to solve it initially same would be presented to the Greater Visakhapatnam Municipal Corporation committee comprising Commissioner, Chief Engineer, concerned Executive Engineer and Consultant. If the dispute is not solved in that case it shall be referred to adjudication / arbitration in accordance with Indian arbitration and conciliation Act 1996.

II SPECIAL CONDITIONS OF CONTRACT

1.0 Brief Description of Task:

This task involves assisting the client in ensuring good quality of construction for the Civil, Mechanical & Electrical works being taken up with the General funds of Greater Visakhapatnam Municipal Corporation.

2.0 Back Ground:

The Greater Visakhapatnam Municipal Corporation has taken up the works with a view to give a quality lift to the town.

For ensuring good quality of construction and improving efficiency, it is proposed to provide third party quality assurance through an independent agency.

3.0 SCOPE OF SERVICES

The tasks of consultants are:

i. Carry out random pre construction QA Checks
ii. Carry out random QA checks during Construction
iii. Carry out random QA checks after construction
iv. Carry out Quantitative checks wherever necessary or rejected.

The role of quality Assurance consultant shall be conducting detailed checks of activities of construction from the starting stage to the finishing stage. This would involve collection of samples and arranging testing. The consultant would be reporting to the concerned officer's level of through weekly report and suggesting interaction with various authorities as and when required. All the tests and quality assurance inspections would be conducted as per the laid down specifications.

a. Establishment of central reporting station at Visakhapatnam for all kinds of communication and weekly reporting to the Commissioner, Greater Visakhapatnam Municipal Corporation for all types of quality tests. The Q.A reports in technical, systematic informative and qualitative manner.
b. The team would be working in Visakhapatnam for conducting Q.C tests.
c. Field staff with required mobile testing equipment for on site inspections including random checks of the works.

d. The following test to be conducted:

3.1 TESTS ON MATERIALS

1. Tests on Cement
   a. Standard Consistency
   b. Fineness
   c. Initial and final setting times
   d. Soundness
   e. Compressive strength
   f. Specific gravity

2. Tests on fine aggregate

3. Tests on coarse aggregate

4. Compressive strength of Concrete (Cubes)

5. Physical Test and Tension test on steel rods

6. All tests on Bricks

7. Concrete Mix design

8. Sieve Analysis of Fine and Coarse aggregates.

3.2 Tests on Soils:

1. Soil tests on bored samples including borings.
2. Pile load and plate load test.
3. Tests on undisturbed soil sample.
4. Compaction tests (Standard and Heavy)
5. Consolidation test.
6. Sieve analysis
7. Hydro meter analysis
8. Swelling pressure test.
9. Tests on disturbed samples.
10. Shear tests
11. Unconfined compression test.
12. Liquid Limit and Plastic limit.

3.3 Tests on Roads:

1. Tests on Bitumen
   a. Penetration
   b. Softening point
   c. Flash & Fire point
   d. Ductility test
   e. Solubility test
   f. Loss on heating
   g. Specific gravity
   h. Bitumen Extraction test
   i. Stripping value, marshall stability, flow, density & void ration etc.,

2. Tests on Coarse Aggregates
   a. Impact value
   b. Crushing value
   c. Los Angles abrasion
   d. Flakiness / Elongnation Index
   e. Water absorption
   f. Specific gravity

3. Tests on Fine Aggregates
   a. Specific gravity,
   b. Bulking
   c. Density
   d. Soundness tests 5 cycles
   e. Material passing through 75 micron IS sieves

4. Mix Design

   a. Job mix formulae for any one of SDBC.

BC.

b. pavement Quality Concrete
(PQC), RCC, PCC.

c. Marshall stability testing on Bituminous
Mixes or hardness test for Mastic Asphalt on prepared sample.

5. Field Test
Pavement design of sub-grade by CBR method.

In addition, the consultant need to check the manufactures test certificates for the materials like pipes & fittings, electrical items, steel, cement, Bitumen (for Grade) etc. The contractor will have to provide these certificates, to the consultants at the time of inspection.

a. The consultant shall faithfully conduct tests/checks and sampling required to be executed by them as per Andhra Pradesh Standard specifications/IRC Specifications/ IE rules/ MORTH/MORD/ IS/PH&MED Specifications to the contractors.

b. The Consultant will be fully responsible for the authenticity of the test results and submit test results in original to the Commissioner, Greater Visakhapatnam Municipal Corporation without any hindrance of work.

3.4 The technical information such as the acceptable limits of the respective tests.

3.5 The basic information whether the required equipment has been used during the work such as

a. 8-10 tones roller (s)
b. Vibrator (S)
c. Paver (S)
d. Concrete Mixer (S)
e. Steel centering
f. Survey Instruments including total station
g. Equipment for condition survey on road and bridges
h. Sieves of all sizes i/c sieve shaker and balances of required capacity
i. Cube strength testing machine
j. Core cutting machine
k. Equipment for cement testing
l. USPV (Ultra Sonic Pulse Velocity) Meter
m. Moister Meter
n. Hammer of all sizes require to e used in building work
o. Rebound hammer
p. Leak Detection Equipments

q. Other miscellaneous equipments such as Screw Driver, Plumb – bob. Ovens, Slump Cone, Graduated Measuring Cylinders of required capacity, Gauge Tape Vernier Calliper, Magnifying Glass, Sprit Level, Vibration Table, Dial Gauge etc.

r. Project Specific instrument, if required.

3.6 PROCEDURE OF INSPECTION

3.7 The Field Quality Assurance staff at the site, which will be headed by one Senior Manager/ Engineer, would inspect the construction and other activities. Field Quality Assurance team would consist of Managers/Engineers from the discipline of civil engineering and one from the discipline of electrical engineering. The consultant would be provided schedule of works likely to be executed in the next week in advance concerned Executive Engineer. so that consultant may plan weekly programme in advance. Besides this, there would be Junior Engineers/Supervisors having similar specialization as mentioned above, Lab Technicians and Field Assistant. However its exact composition will depend upon the, scope of work and the workload based on number of contracts executed by Greater Visakhapatnam Municipal Corporation.

3.8 After obtaining the construction programme and the work schedule from Superintending Engineer's Office, a joint visit of the Greater Visakhapatnam Municipal Corporation Engineers to the sites for inspection and overall appraisal shall be undertaken.

3.9 All Tests, checks are to be carried out as per relevant IRC Codes and IS Specifications, APSS and as per IE rules, Agreements and Drawings for qualitative and quantitative analysis.

3.10 The Consultant shall make its own arrangements for transport including local travel and for his Office accommodations.

The Consultants shall be supplied with all the latest construction drawings and Contractor's agreements along with technical specification and would interact directly with **the Visakhapatnam Municipal Corporation.**

4. Assessment about the process involved in the construction, like curing, pitting etc.,
5. The L.S. sections, cross sections or both indicating final levels which are required for the work for qualitative assessment about the finished work. For the above basic information of designs, drawings showing the level (pre/post levels) will be furnished by the respective Executive Engineers.

6. The interim quality assurance reports should also contain the assessment on the over all quality of work done.
7. The reports shall be furnished in time to process the work bills for payment.
8. The quality assurance staff shall be make available whenever required on the works and site test reports.

9. Schedule of Inspection

The following inspection schedule shall be adhered by the Consultants' Field Quality Assurance team, Surprise checks every day or alternate day or depending upon the job requirements. The Manager/Consultants Engineer will identify the items and the location on site, which will be inspected upon by the Assistant Manger/Site Engineers for the next working day. The concerned engineer of the Greater Visakhapatnam Municipal Corporation would be responsible for regular supervision of construction work & workman ship of all the construction works. The Contractor would be advised not to carryout important activities of construction without prior information to concerned Executive Engineer as well as representative of third party quality assurance consultants.

10. Reporting System

Documentation of the reports on each work taken up in the Greater Visakhapatnam Municipal Corporation some work-wise photographs & Video, before commencing, during and after execution with finals sets of report would be submitted to the Commissioner, Greater Visakhapatnam Municipal Corporation with a copy to the Superintending Engineer / Chief Engineer.

11. Price & Payment schedule

11.1 _____

11.2 Service Tax:

The Consultants would deposit the Service Tax (as applicable) on receipt of payment to the Central Excise Department and the copy of the remittance challan would be submitted to the Municipal Corporation as a proof of payment of service Tax.

11.3 Payment Schedule:

The Consultant shall raise the invoice immediately after certifying the quality of work. The client would make the payment in favour of consultant within 2 (two) weeks time after submission of the invoice by the consultant.

11.4 Standard Deductions: Mandatory deductions from the consultancy fee would be made from time to time for Income Tax, NAC & VAT as applicable.

12.0 Indemnity:

In case the quality of any work if found inferior to the specification given to Quality assurance consultant, during the Quality check by the State Vigilance department or by any other authority, the Consultant shall indemnify the Municipal Corporation to an extent of consultancy fee payable for that work.

13.0 Other Conditions:

13.1The consultant's reporting shall be of recommendatory nature informing the Greater Visakhaptnam Muncipal Corporation, Visakhapatnam, Andhra Pradesh about the quality of materials, based on test results and field observations.

13.2 The construction schedule of various works for which Quality Inspection is required will be given to the Consultants by Greater Visakhapatnam Municipal Corporation, Visakhapatnam, Andhra Pradesh will be given 15 days in advance. The programme of critical activities to be executed for the consequent month will also be given 15 days in advance.

13.3 In case of emergency consultant will have to submit specific report of that concerned work as indicated by the Client.

14.0 Period of Agreement:

One year from the date of entering into agreement or extended from time to time on mutual agreement.

Eligibility Conditions: -

1. The selection of the consultant shall be based on previous experience, lab facilities and experience of technical persons and offered rate.
2. The consultant shall submit list of lab equipment they are having
3. The Consultancy firms for Quality Assurance should have 2 years previous experience in similar assignment. The experience certificate issued by the competent authority i.e., State Government, Government of India, Government undertakings & ULBs should be produced along with bid for verification.
4. Service Tax Registration certificate shall be produced along with the tender.
5. The tenderer should have qualified engineers, analysts, lab technicians and necessary personnel. The list of the same along with their respective qualification certificates shall be produced along with the tender.
6. The Tenderer must pay the schedule cost & sales tax of amount of Rs. 2500/- DD in favour of Commissioner GVMC
7. The Tenderer must pay the EMD of Rs. 1,00,000/- in the shape of DD / BG in favour of Commissioner, GVMC along with the tender document.
8. The tenderer / constancy firm shall have the laboratory facility at Visakhapatnam city or tie-up with accredited lab in VSP.
9. The Tenderer must produce PAN Number.
10. The Tenderer should quote below 1% on Value of work done
11. The tenderer should submit a statement for Third Party verification for a value of Rs.25.00 lakhs in any one of the last five years. (2010-11, 2011-12, 2012-13, 2013-14 & 2014-15).
12. If the successful tenderer does not follow the conditions for Quality Check up or without lab facility, will be terminated without any further information.
13. If the tender gets two works, ie., S.E (PW-I) and S.E(PW-II) after finalization then only one work will be awarded.
14. If the tenderer involve malpractice or collusion with Contractor / Engineer the work will be terminated without notice and suitable action will be invited.

PRICE BID

Name of the Work: - Third party quality control system to Executive Engineer works in Zone-V & Zone-VI Civil works and Mechanical & Electrical and procurement of supplies / spares costing above one lakh executed by Greater Visakhapatnam Municipal Corporation for one Year.

I Sri / Smt _____ do hereby express my willingness to execute the aforesaid work as per the conditions, standard specifications, rules, regulations, etc., stipulated in the tender documents at ___ (_____) of value of work done.

SIGNATURE, NAME OF THE TENDERER / AUTHORISED SIGNATOR

Organization: Greater Visakhapatnam Municipal Corporation, Visakhapatnam.

Name of the Work:
Sanctioned Scheme:
Division :
Area/ Location :

REINFORCED CEMENT CONCRETE.

I (a) Cement Test Report-Fineness

Name of the Test	Required grade as per Estimate PPC/OPC 33/OPC43/OPC53		Requirement as per IS Code	Actual fineness	Acceptability		Remarks if any
	PPC/OPC	Actual Grade			Grade Yes/No	Fineness Yes/No	

I (b) Cement Test Report-Setting time

Setting time test	Setting time required as per IS Code (minutes)	Actual Setting times	Acceptability	Remarks
(i) Initial				
(ii) Final				

Tenderer

I © Cement Test Report-Compressive strength vs Grade

Compressive strength (N/mm)	Required	Actual	Acceptability	Remarks
(i) Grade				
(ii) 3 day strength				
(iii) 7 day strength				
(iv) 28 day strength				

II. MIXER, HOPPER & BOXES

Concrete mixer is used Yes/No	Mixer having hopper or not Yes/No	Mixer having measuring boxes for metal Yes/No	Mixer having Measuring Box for sand Yes/No	Acceptability	Remarks

III SLUMP TEST

Where check	Slump teat of concrete carried out or not	Type of test (Cone slump test)	Slump allowed	Actual Slump	Acceptability	Remarks

IV COMPRESSIVE STRENGTH OF CONCRETE

Name of the Test	Mix proportion	Minimum compressive test	7th day test report required strength	Actual strength	28th day test report required strength	Actual strength	Acceptability	Remarks

V. STRENGTH OF THE STEEL RODS

Sample collected from where	Name of the Test	Tested or not Yes/No	DIA of the rod	Minimum required tensile strength as per IS Code	Actual tensile strength	Required weight/ meter	Actual weight/meter	% of elongation required	Actual elongation %	Acceptability	Remarks

VI SPACING, DIA, COVER LAP

Spacing required	Actual spacing	Dia required	Actual Dia	Over lap required	Actual lap provided	Acceptability	Remarks

VII COVER MAINTENANCE

Where tested	Component of the structure Slab/Beam/Column etc. specify	Cover required	Actual cover	Acceptability	Remarks

VIII TEST FOR HOOK of ends

Where conducted/used	Hook is provided or not	Hook is Proper or not	Acceptability	Remarks

IX BINDING OF RODS

Where used	Rod to rod binding done or not Yes/No	Binding is proper or not Yes/No	Acceptability	Remarks

X REINFORCEMENT MEASUREMENT

Where checked	Reinforcement measure or not Yes/No	Recorded or not Yes/No	Check measured Or not Yes/No	Required reinforcement as per design	Actual reinforcement	Acceptability	Remarks

X I H.G. METAL TEST REPORT

Where checked	Name of the test	Required size of metal	Passage required as per IS 383-1970	Actual passage as per test	Acceptability	Remarks

SAND

Where sample taken	Type of Test	Zone required	Actual Zone	Acceptability	Silt acceptance %	Actual silt %	Acceptability	Remarks

MEASUREMENT/CHECK FOR CONCRETE SECTIONS

Name of the component column/Area/Slab etc.	Required dimensions as per drawing (mention L,B,D)	Actual Dimensions	Acceptability	Remarks

CHECK FOR CURING

Name of component	No. of days curing required as per IS Code	No. of days curing done	Acceptability	Remarks

MAINTENANCE AND USE OF CEMENT/ SAND AND METAL

Raw Material Type	Record maintained or not for usage	Remarks
Cement		
Sand		
Metal		
Steel Rods		

Organization: Greater Visakhapatnam Municipal Corporation, Visakhapatnam.

Name of the Work:
Sanctioned Scheme:
Division :
Area/ Location :

1. Sand Bed

Sand Bed provided or not	Thickness as per estimate	Thickness provided	Acceptability	Remarks

2.a) Cement Test Report-fineness

Name of the Test	Required grade as per estimate PPC/OPC 33/OPC43/OPC53		Requirement as per IS Code	Actual fineness	Acceptability		Remarks if any
	PPC/OPC	Actual Grade			Grade Yes/No	Fineness Yes/No	

Tenderer

2(b) Cement Test Report-Setting times

Setting time test	Setting time required as per IS Code (minutes)	Actual Setting times	Acceptability	Remarks
(i) Initial				
(ii) Final				

2 (C) Cement Test Report-Compressive strength Vs Grade

Compressive strength (N/mm)	Required	Actual	Acceptability	Remarks
(i) Grade				
(ii) 3 day strength				
(iii) 7 day strength				
(iv) 28 day strength				

3. H.G. METAL-Size of metal

Where used	Name of the test	Required size of metal	Is the metal confirms as per IS in sieve analysis Yes/No	Acceptability	Remarks

4. SAND- Zone&silt

Where used	Type of test	Zone required	Actual zone	Acceptability	Silt acceptance %	Actual silt %	Acceptability	Remarks

5. MIXER, HOPPER & BOXES

Concrete mixer is used Yes/No	Mixer having hopper or not Yes/No	Mixer having measuring boxes for metal Yes/No	Mixer having Measuring Box for sand Yes/No	Acceptability	Remarks

6. SLUMP TEST

Where checked	Slump test of concrete carried out or not	Type of test (Cone slump test)	Slump allowed	Actual Slump	Acceptability	Remarks

7. COMPRESSIVE STRENGTH OF CONCRETE

Name of the Test	Mix proportion	Minimum compressive test	7th day test report required strength	Actual strength	28th day test report required strength	Actual strength	Acceptability	Remarks

8. VENT

Where checked	Template is available or not Yes/No	Is the vent as per template Yes/No	Is the vent as per drawing Yes/No	Inner drain need or not	Inner drain provided or not	Acceptability	Remarks

9. SLOPE

Where checked	Whether leveling instrument used or not	Slope required as per design	Actual slope	Acceptability	Remarks

10. MORTAR SAMPLE TESTING

Where used		Cement and sand ratio required	Actual Cement sand ratio	Acceptability	Remarks

11. PLASTERING THICKNESS

Where used	Plastering thickness required as per estimate	Actual plastering thickness	Acceptability	Remarks

12. UNDULATIONS & HONEY COMB CHECKING

Where checked	PIN vibrator used Yes/No	Metal exposed Yes/No	Acceptability	Remarks

13. CHECK FOR CURING

Name of component	No. of days curing required as per IS Code	No. of days curing done	Acceptability	Remarks

Organization: Greater Visakhapatnam Municipal Corporation, Visakhapatnam.

Name of the Work:
Sanctioned Scheme:
Division :
Area/ Location :

1.2. ROAD WORKS

A. Quarry Rubbish Roads.

1.Raw material

Quarry rubbish required	Whether the material is kept in stacks	Whether measurements are taken and recorded	Whether check measurements done	Quantity collected	Remarks

2. Work

Where checked	Measurement taken for work	Measurement recorded or not	Check measurement done or not	Remarks

3. Depth

Depth required as per estimate	Actual Depth	Acceptability	Remarks

4. Consolidation/ Rolling

Type of Roller used (its capacity, tones)	Roller running speed slow or not Yes/No	No. of times rolled (minimum 8 – 10 times) Yes/No	Over lap as per design	Actual over lap	Acceptability	Remarks

5. Watering

Watering done or not Yes/No	Watering satisfactory or not as per visual observation	Acceptability	Remarks

Organization: Greater Visakhapatnam Municipal Corporation, Visakhapatnam.

Name of the Work:

Sanctioned Scheme:

Division :

Area/ Location :

B WBM ROADS

1. Raw material quantity

Grading used	HG Metal quantity required	Kept stacks or not Yes/No	Measurements taken and recorded Yes/No	Check measurement done or not Yes/No	Quantity collected	Remarks
Grading 1						
Grading 2						
Grading 3						

2. Size of the metal

Requires size	Actual size as per visual observation	Acceptability	Remarks

3. Test Report of size,

Where checked	Grade of metal required	Actual Grade	Acceptability	REmarks

4. Test report of abrasion, impact value, combined Flakiness & Elongation indices.

Abrasion value accepted	Actual value	Aggregate impact value accepted	Actual value	Combined flakiness & Elongation indices	Actual value	Acceptability	Remarks
Not more than 40%		Note more than 30%		Not more than 30%			

5. Thickness

Layer No.	Thickness required	Actual thickness	Measured with gauge Yes/No	Acceptability	Remarks

6. Consolidation/ rolling

Type of Roller used (its capacity, tones)	Roller running speed slow or not Yes/No	No. of times rolled (minimum 8 – 10 times) Yes/No	Over lap as per design	Actual over lap	Acceptability	Remarks

7. Density Test

Sample No.	Specific location	Density test done or not	Volume in Cum	Minimum weight of metal required / Cum	Actual weight of metal / Cum	Acceptability	Remarks
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

8. Camber

Camber required as per design	Acceptability as per visual observation	Camber board/template used Yes/No	Camber accepted or not

Organization: Greater Visakhapatnam Municipal Corporation, Visakhapatnam.

Name of the Work:
Sanctioned Scheme:
Division :
Area/ Location :

C. BT/SDBC/BM ROADS

1.(a)Test Report of size,

Where checked	Grade of metal required	Actual Grade	Acceptability	Remarks

1 (b) Test report of abrasion, impact value, combined Flakiness & Elongation indices.

Abrasion value accepted	Actual value	Aggregate impact value accepted	Actual value	Combined flakiness & Elongation indices	Actual value	Acceptability	Remarks

2. Bitumen Test

Sample collected from	Grade of bitumen as per estimates	Grade used	Penetration value (range) required	Actual penetration	Acceptability	Remarks

3. Test for bitumen content and size of metal used

Location	Sample dimension	Bitumen content required as per design	Actual content	Metal size as per design	Actual size	Acceptability	Remarks

4. Consolidation/ rolling

Type of Roller used (its capacity, tones)	Roller running speed slow or not Yes/No	No. of times rolled (minimum 8 – 10 times) Yes/No	Over lap as per design	Actual over lap	Acceptability	Remarks

5.Camber

Camber required as per design	Acceptability as per visual observation	Camber board/template used Yes/No	Camber accepted or not

6. Thickness

Layer No.	Thickness required	Actual thickness	Measured with gauge Yes/No	Acceptability	Remarks

7. No Water stagnation on surface due to Dips

Type of test	Test mode	No. of dips observed	Test mode	No. of dips observed	Remarks
Thread test	Along the road		Across the road		

8. Bitumen heating temperature

Grade of Bitumen	Laying temperature required	Actual	Rolling temperature required	Actual	Acceptability	Reemarks
35	Not less than 130 ^{0}C		Not less than 100 ^{0}C			
65	Not less than 125 ^{0}C		Not less than 90 ^{0}C			
90	Not less than 115 ^{0}C		Not less than 80 ^{0}C			

Organization: Greater Visakhapatnam Municipal Corporation, Visakhapatnam.

Name of the Work:
Sanctioned Scheme:
Division :
Area/ Location :

CEMENT CONCRETE ROADS

1.a) Cement Test Report-Fineness

Name of the Test	Required grade as per test PPC/OPC 33/OPC43/OPC53		Requirement as per IS Code	Actual fineness	Acceptability		Remarks if any
	PPC/OPC	Actual Grade			Grade Yes/No	Fineness Yes/No	

1(b) Cement Test Report-Setting time

Setting time test	Setting time required as per IS Code (minutes)	Actual Setting times	Acceptability	Remarks
(i) Initial				
(ii) Final				

1 (C) Cement Test Report-Compressive strength Vs Grade

Compressive strength (N/mm)	Required	Actual	Acceptability	Remarks
(i) Grade				
(ii) 3 day strength				
(iii) 7 day strength				
(iv) 28 day strength				

2.H.G. METAL

Where checked	Name of the test	Required size of metal	Is the metal confirms as per IS in sieve analysis Yes/No	Acceptability	Remarks

3.SAND

Where Checked	Type of test	Zone required	Actual zone	Acceptability	Silt acceptance %	Actual silt %	Acceptability	Remarks

4.MIXER, HOPPER & BOXES

Concrete mixer is used Yes/No	Mixer having hopper or not Yes/No	Mixer having measuring boxes for metal Yes/No	Mixer having Measuring Box for sand Yes/No	Acceptability	Remarks

5. SLUMP TEST

Where conducted	Slump of concrete carried out or not	Type of test	Slump allowed	Actual Slump	Acceptability	Remarks

6. COMPRESSIVE STRENGTH OF CONCRETE

Name of the Test	Mix proportion	Minimum compressive test	7th day test report required strength	Actual strength	28th day test report required strength	Actual strength	Acceptability	Remarks

7.MAINTENANCE AND USE OF CEMENT/ SAND AND METAL

Raw Material Type	Record maintained or not for usage	Remarks
Cement		
Sand		
Metal		
Steel Rods		

8.Vibration

Where checked	Plate vibrator used Yes/No	Acceptability	Remarks

9. Camber

Camber required as per design	Acceptability as per visual observation	Camber board/template used Yes/No	Camber accepted or not

10. Thread Test for dips

Type of test	Test mode	No. of dips observed	Test mode	No. of dips observed	Remarks
Thread test	Along the road		Across the road		

11. Curing

No of Days to be cured	No of days cured	Method of Curing	Remarks
		Ponding with soil Yes/No	

WATER SUPPLY PIPE LINES

1.Sand cushion bed.

Sand bed provided or not	Type of required pipe as per estimate	Dia. of the pipe	Thickness required as per IS code/estimate	Thickness provided	Acceptability (Yes /No)	Remarks

2.Filling over the pipe – Visual observation:

Over the pipe filling done or not	Sand over the pipe line adequate or not	Acceptability (Yes /No)	Remarks

3.Check of the manufacture of pipes:

Type of pipe	Name of the the manufacturing unit	As per material verification	As per the records	Acceptability (Yes /No)	Remarks

4.Manufacturers certificate for Major works:

Certificate from manufacturer provided or not	Pressure test passed or not	Other test (specify) passed		Required class	Class of the pipe as per test	Acceptability (Yes /No)	Remarks

5.Jointing visual observation

Jointing quality good or not	Acceptability(Yes /No)	Remarks

6. Quality of rubber rings test (details to be furnished by T.P.Q.C)

7. HDPE pipes jointing -- Temp. Requirement

Where	Dia. of the pipes	Required temp. to be heated upto	Actual temperature	Acceptability (Yes /No)	Remarks.

8. Field test for pressure Withstanding

Pressure test is done or not (yes/no)	Withstanding pressure required	Pipes passed the test or not	Acceptability (Yes /No)	Remarks

9.Valves provided for better regulation:

Type of the valve provided	Is type OK Yes/No	Place of valve provided	Is place suitable Yes/No	Acceptability (Yes/No)	Remarks

10..Provisions of valves at required places:

Where provided	Is there any accumulation of air at the place	Places where required but not provided	Why to be provided	Acceptability (Yes/No)	Remarks

I. Road Works

Name of the work: **Scheme:**
Location/Area : **Agency:GVMC**
----------Check list for the Executive Engineer----------

A.Quarry rubbish roads:

1.Quantity required and quantiy collected (The quantity to be kept in stacks.) (Yes/No)

2.Whether measurements taken and recorded; (For material and for the work.) (Yes/No)

3.Whether check measurements done; (Dy.E.E/ >5 lakhs by EE) Yes/No)

4.Depth/Thickness as required; (As per estimate.) (Yes/No)

5.Whether consolidation satisfactory;(8-10 times rolling with the roller running slowly.) (Yes/No)

6.whether watering is satisfactory; (Visual Observation.) (Yes/No)

B.WBM Roads:

1.HG metal quantity required and quantity collected;(23mm –75mmi.e Grade3 to Grade1(smaller the size more the cost.) (Yes/No)

2.Whether measurements taken and recorded.(In stacks for material.Generally 2cu.m) (Yes/No)

3. Whether the metal size is as per requirement on (Visual observation) (Yes/No)

visual observation.

4.Size,Abrasion test,crushing strength etc. (Test conducted) (Yes/No)

5.Whether thickness of layers is as per provision in(To be done with guage.) (Yes/No)
the estimates.

6.Whether proper rolling is done. (1.Slow running of roller and 2.physical observation.)
(Yes/No)

7.Density test after rolling is completed. (Whether it is within the
(Yes/No)

Limits(0.5X0.5Xdepth); After consolidation 30-35 kg of metal shall be there.)

8.Whether required camber is provided. (Visual observation)
(Yes/No)

C.BT/SDBC/BM Roads:

1.HG metal quantity required and quantity collected;(23mm –75mmi.e Grade3 to Grade1(smaller the size more the cost.) (Yes/No)

2.Whether measurements taken and recorded.(In stacks for material.Generally 2cu.m) (Yes/No)

3. Whether the metal size is as per requirement on (Visual observation)
(Yes/No)

Visual observation.
4.Size, Abrasion test, crushing strength etc. (Test conducted) (Yes/No)

5.Whether samples are collected and sent for testing (This is to be done in laboratory.)
(Yes/No)
the bitumen contents and, for sizes of the metal used.

6.2.Whether proper consolidation done. (Visual observation)
(Yes/No)
7.Whether required camber is provided. (Visual observation)
(Yes/No)

8.Whether required thickness after consolidation (to be checked with guage.)
(Yes/No)
is there;

9.The surface shall be such that the rain water will not(With a thread along & across the road.)
(Yes/No)
be stagnated in pockets due to dips.

10.The bitumen heating shall be to required temperature (110-120 degree celcius-Thermometer.)
(Yes/No)
Name of the work: **Scheme:**
Location/Area : **Agency:GVMC**

----------Check list for the Executive Engineer----------
D.Cement Concrete Roads:

1.Concrete mixer to have hopper. (Measuring boxes can be used (Yes/No)
to put in mixer ensuring proper
Measurements.)

2.Whether cement is tested and satisfactory. (Test reports.)
(Yes/No)

3.Whether size of the metal is as per requirement.(Visual observation &test reports.)
(Yes/No)

4.Whether the sand contains **silt** not more than permissible;(Test reports.)
(Yes/No)

5.Whether measuring boxes used for metal and sand: (Visual observation.)
(Yes/No)

6. Whether cubes are casted for testing compressive (1. 7th day report. 2) 28th day report.)
(Yes/No)
strength.

7.Whether maintaining record of using of cement bags, (Record to be checked.)
(Yes/No)
sand and metal for each bag/half bag used.

8.Whether vibration is properly done.	(Plate vibrator to be used. No metal to be on the surface. A layer of mortar to be formed on the surface.) (Yes/No)
9.Whether camber is maintained.	(Visual observation.) (Yes/No)
10.The surface shall be with out dip pockets.	(This can be cheched with thread.) (Yes/No)
11.Whether proper curing is being done.	(21 days curing required with ponding method with black cotton soil.) (Yes/No)

Name of the work: **Scheme:**
Location/Area : **Agency:GVMC**

----------Check list for the Executive Engineer----------

II.Cement concrete Drains

1.Whether sand bed of required thickness is provided or not	(4inches-6 inches cushion (Yes/No) (very imp. For drains))
2.Cement test conducted and report available (Yes/No)	(Very important.)
3.Test report of HG metal ; sand for concrete conducted	(Test reports on size;grain (Yes/No) size and silt.)
4. Concrete mixer to have hopper.	(Measuring boxes can be used (Yes/No) to put in mixer ensuring proper measurements.)
5. Whether measuring boxes used for metal and sand	(Visual observation) (Yes/No)
6.Whether slump test of concrete is carried out or not	(Result to be with in permissible (Yes/No) limits. Cone slump test 30-40 mm Slump allowed.)
7. Whether cubes are casted for testing compressive strength.	((1) 7th day report. (2) 28th day (Yes/No) report)
8.Whether vent provided is as required in the design.	(For type design this can be (Yes/No) Checked with the templates 1.Section of the drain against drawing to be checked. 2.Inner drain for sullage also to be checked.)
9.Whether required slope is provided or not.	(With leveling instrument.) (Yes/No)
10.Whether plastering mortar sample is sent for testing. (Yes/No)	
11.Plastering thickness as per estimate	(Check with estimate (Commonly (Yes/No) 12mm or 20mm))
12.There shall not be undulations or honeycomb in the Concrete surface.	(Metal should not be exposed. (Yes/No) Vibration should be proper. Pin vibrator to be used.)

Name of the work: **Scheme:**
Location/Area : **Agency:GVMC**

----------Check list for the Executive Engineer----------

III.Reinforced Cement Concrete

1..Cement test conducted and report available (Yes/No)	(Very important.)
2.Test report of HG metal ; sand for concrete conducted	(Test reports on size;grain (Yes/No) size and silt.)
3. Concrete mixer to have hopper.	(Measuring boxes can be used (Yes/No) to put in mixer ensuring proper measurements.)
4. Whether measuring boxes used for metal and sand	(Visual observation) (Yes/No)
5.Whether slump test of concrete is carried out or not	(Result to be with in permissible (Yes/No) limits. Cone slump test 30-40 mm Slump allowed.)
6. Whether cubes are casted for testing compressive strength.	((1) 7th day report. (2) 28th day (Yes/No) report)
7.For cement concrete as above.	(To be checked as above.) (Yes/No)
8.Whether steel rod are sent for testing or not.	(Yes/no)
9.Whether the placement is as per the design requirement i.e spacing, diameter ,over laps.	(As per code.) (Yes/No)
10.Whether required cover i.e distance between outer point of the rod and outer surface of concrete is maintained or not.	(Visual Observation.) (Yes/No)
11.In case of stir-ups proper hook of ends is provided or not.	(Visual Observation.) (Yes/No)
12Whether rod-to-rod tying with binding wire is proper or not.	(Visual Observation.) (Yes/No)
13.Whether reinforcement is measured and recorded or not. Whether check measurement is done or not.	(Before concrete this has to (Yes/No) be done.)

Name of the work: **Scheme:**
Location/Area : **Agency:GVMC**

----------Check list for the Executive Engineer----------

IV.Water Supply Pipe lines

1.Sand cushion bed of required thickness is provided or not.	(Min. of 6 inches.) (Yes/No)
2.Whether sand as required over the pipeline is provided or not.	(To be covered with Sand upto top.) (Yes/No)
3.Whether the pipes are from required manufacturing unit or not.	(To verify and record. (HDPE/ACC used ; GI for smaller Dia.)) (Yes/No)
4.In case of major works manufacturers certificate available.	(For pressure test etc.) (Yes/No)
5.Whether the pipes are of required class	(As per test.(pressure etc.)) (Yes/No)
6.Whether proper jointing is done or not.	(Visual Observation(Rubber rings for ACC;Welded under heating for) (Yes/No)
7.Quality of rubber rings acceptable.	(Test report.) (Yes/No)
8.In case of HDPE pipes jointing whether heating is up to the required temperature.	(Gauge for measurement) (Yes/No)
9.Whether field test pressure as required is being done or not.	(To be recorded in M-book.) (Yes/No)
10.Whether valves at required places provided for better regulations.	(As a thumb rule every junction one Valve.) (Yes/No)
11.Whether air valves are provided at required places or not.	(Where there is a Possibility of air locking.) (Yes/No)

APPENDIX A: SCHEDULE OF TESTING

1. **CIVIL WORKS**

The following schedule of testing of materials is being followed for different kinds of works.

3rd Party Quality Assurance / Quality Control of Civil Works in various Mission and Non-Mission Cities in Andhra Pradesh					
Standards / Norms for Testing of Materials and Works					
Sl. No	**Material**	**Test to be performed**	**IS code**	**No. of Samples to be taken by Agency / PMC (as per IS Code)**	**No. of Samples to be taken by Agency / PMC (as per IS Code)**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
For Material Procured at Sites					
1	Cement	Physical and Chemical tests	IS:269 IS:455 IS:1489 IS:8112 IS:12269	Once for each source of supply and occasionally when called for in case of long/improper storage. Besides the Contractor also will submit daily test data on cement released by the Manufacturer .	As per IS (As mentioned in Column 5)
2	Coarse and Fine aggregates	(i) Gradation	IS: 2386 (Pt.1)	One test for every day's work of each fraction of coarse aggregate and fine aggregate, initially; may be relaxed later at the discretion of the Engineer.	25% of Total sample as specified in column 5
		(i)Flakiness and Elongation Index	IS: 2386 (Pt.1)	Before approving the aggregates and every month subsequently	
		(ii) Deleterious constituents	IS: 2386 (Pt.2)	One test for every day's work of each fraction of coarse aggregate and fine aggregate, initially; may be relaxed later at the discretion of the Engineer.	
3	Coarse Aggregate	(i) Los Angeles Abrasion Value or Aggregate Impact test	IS: 2386 (Pt.4)	Once for each source of supply and subsequently on monthly basis.	As per IS (as mentioned in Column 5)
		(ii) Soundness	IS: 2386 (Pt.5)	Before approving the aggregates and every month subsequently	As per IS (as mentioned in Column 5)

		(iii) Alkali aggregate reactivity	IS:2386 (PT.7)	Before approving the aggregates and every month subsequently	As per IS (as mentioned in Column 5)
4	Water	Chemical Tess	IS:2386 (PT.7) IS:456	Once for approval of source of supply, subsequently only in case of doubt.	As per IS (as mentioned in Column 5)
5	Concrete	(i) Strength of concrete	IS : 516	1 to 5 m^3 of Concrete – 1 Sample	25% of Total Sample as specified in Column 5
				6 to 15 m^3 of Concrete – 2 Sample	
				16 to 30 m^3 of Concrete – 3 Sample	
				31 to 50 m^3 of Concrete – 4 Sample	
				51 and above 50 m^3 of Concrete – 4 plus one additional sample for each additional 50 M^3 or part thereof.	
		(ii) Core strength on hardened concrete	IS: 516	As per the requirement of the Engineer, only in case of doubt.	
		(iii) Workability of fresh concrete slump test	IS: 1199	One test per each dumper load at both Batching plan site and paving site initially when work starts. Subsequently sampling may be done from alternate dumper.	
		(iv) Thickness determination		From the level data of concrete pavement surface and sub-base at grid points of 5/6.25m x 3.5m	
		(v) Thickness measurement for trail length		3 cores per trial length	
		(vi) Verification of level of string line in the case of slip form paving and steel forms in the case of fixed form paving		String line or steel forms shall be checked for level at an interval of 5.0 m or 6.25 m. The level tolerance allowed shall be + 2mm. These shall be got approved 1-2 hours before the commencement of the concreting activity.	

3. SEWERAGE SECTOR											
3rd Party Quality Assurance/Quality Control Civil Works in GREATETR VISAKHAPATNAM MUNICIAPL CORPORATION, VISAKHAPATNAM											
Standards/Norms for Testing of Materials and Works											
Sl. No	**Type of Pipe/Material/ Unit**	**IS Code**	**Sampling Criteria**								**Remarks**
			Quantity (No of Bricks)	**Physical Tests**	**Hydraulic Tests**	**Crushing Strength/ Three Edge Bearing**	**Material Tests**		**Other tests (1)**	**Other tests (1)**	
1	Stone Ware Glazed Pipes (SWG)	IS 651-2007	0-150	20	5% of Pipes in the lot	3	3				Material Tests include water absorption test and resistance of action of alkali and acids.
			151-280	32	5% of Pipes in the lot	5	5				
			281-500	50	5% of Pipes in the lot	5	5				
			501-1200	80	5% of Pipes in the lot	5	5				
			1201-3200	125	5% of Pipes in the lot	8	8				
			3201-10000	200	5% of Pipes in the lot	8	8				
2	Un plasticized Non Pressure PVC for UGD (PVC-U)	IS 15328:2003	1-1000	13			5	3		3	Resistance to external blows is mentioned under other tests (2) Material tests include reversion and vicat softening temperature tests.
			1001-3000	20			8	3		3	
			3001-10000	32			13	5		5	
			10001 and above	50			20	8		8	

3. SEWERAGE SECTOR											
3rd Party Quality Assurance/Quality Control Civil Works in GREATETR VISAKHAPATNAM MUNICIAPL CORPORATION, VISAKHAPATNAM											
Standards/Norms for Testing of Materials and Works											
Sl. No	**Type of Pipe/Material/ Unit**	**IS Code**	**Sampling Criteria**								**Remarks**
			Quantity (No of Bricks)	**Physical Tests**	**Hydraulic Tests**	**Crushing Strength/ Three Edge Bearing**	**Material Tests**		**Other tests (1)**	**Other tests (1)**	
1	Stone Ware Glazed Pipes (SWG)	IS 651-2007	0-150	20	5% of Pipes in the lot	3	3				Material Tests include water absorption test and resistance of action of alkali and acids.
			151-280	32	5% of Pipes in the lot	5	5				
			281-500	50	5% of Pipes in the lot	5	5				
			501-1200	80	5% of Pipes in the lot	5	5				
			1201-3200	125	5% of Pipes in the lot	8	8				
			3201-10000	200	5% of Pipes in the lot	8	8				
2	Un plasticized Non Pressure PVC for UGD (PVC-U)	IS 15328:2003	1-1000	13			5	3		3	Resistance to external blows is mentioned under other tests (2) Material tests include reversion and vicat softening temperature tests.
			1001-3000	20			8	3		3	
			3001-10000	32			13	5		5	
			10001 and above	50			20	8		8	

Sl. No	Type of Brick	IS Code	Sampling Criteria								Remarks
			Quantity (No of Bricks)	Physical Tests	Hydraulic Tests	Crushing Strength/ Three Edge Bearing	Material Tests		Other tests (1)	Other tests (1)	
3	Precast concrete pipes (with and without reinforcement) RCC pipes	IS 458:2003	1-50	8							Absorption, Permeability and straightness test are shown under other tests.
			51-100	13							
			101-300	20							
			301-500	32							
			501 and above	50							
4	Cast Iron Manhole covers	IS 1726:1991	1-15	3					3	1 in 50	Other Tests (1) include coating test samples and other test (2) are samples for load test.
			16-25	5					3		
			26-50	8					3		
			51-100	13					4		
			101-150	20					5		
			151-300	32					7		

3. SEWERAGE SECTOR Contd.											
3rd Party Quality Assurance/Quality Control Civil Works in GREATETR VISAKHAPATNAM MUNICIAPL CORPORATION, VISAKHAPATNAM											
Standards/Norms for Testing of Materials and Works											
			Sampling Criteria								
Sl. No	**Type of Brick**	**IS Code**	**Quantity (No of Bricks)**	**No. of bricks to be selected for dimensional characteristics for group of 20 bricks**	**Visual Characteristics and dimensions**	**Water Absorption**	**Compressive Strength**	**Other tests**	**Drying shrinkage**	**Bulk Density /Block Density**	**Remarks**
5	Clay Bricks	IS 1077:1992	2001-10000	40	20	5	5	5		5	Physical tests include breaking Load, Transverse strength, and Efflorescence.
			10001-35000	60	32	10	10	10		10	
			35001-50000	80	50	15	15	15		15	
6	Fly Ash Bricks	IS 12894:2002	2001-10000	40	20	5	5	5		5	Physical tests include breaking Load Transverse strength, and Efflorescence.
			10001-35000	60	32	10	10	10		10	
			35001-50000	80	50	15	15	15		15	
7	Cement bricks	IS 2185 :1979	Every 1-5000		20	3	8		3	3	The three bricks would be subjected to moisture content test after the completion of drying shrinkage. The remaining 3 bricks are kept if any need arises.

PPENDIX – B SCHEDULE OF INSPECTION						
3rd Party Quality Assurance/Quality Control Civil Works in GREATETR VISAKHAPATNAM MUNICIAPL CORPORATION, VISAKHAPATNAM						
Standards/Norms for Testing of Materials and Works						
Sl No	Details of Work	Item	Scope of 3rd Party (Independent Agency)	Scope of Work to be performed by 2nd Party (Public Health Dept. / Executing Agency)	Responsibilities of 1st Party (Contractor)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1. **WATER SUPPLY PROJECTS**					
1	Construction of Reservoirs					
a	Site Clearance and Marking		One Visit	Regular	Constant	1st and 2nd parties confirm the levels at site as per approved design.
b	Inspection of Material		One Visit	As per IS	Following instructions of Dept. Engineer	1st Party to makes available all approved drawings at site before starting the work.
c	PCC bed	Concreting	One Visit	As per IS	Following instructions of Dept. Engineer	
d	Raft Concrete	Reinforcement Fabrication	One Visit	Regular	Constant	3rd Party conducts NDT Tests for each and every unit after completing 28 days of curing period in presence of 1st and 2nd party and necessary suggestions are given in case of any deficiencies found.
		Concreting	One Visit	As per IS	Constant	
e	Columns	Reinforcement Fabrication	One Visit for each stage	Regular	Constant	

		Concreting	One Visit for each stage	As per IS	Following instructions of Dept. Engineer	
f	Brace Beams	Reinforcement	One Visit for each stage	Regular	Constant	
		Concreting	One Visit for each stage	As per IS	Following instructions of Dept. Engineer	
g	Bottom Dom / Side Walls / Top Dom	Reinforcement Fabrication	One Visit each for bottom dome &top dome & two visits for side wall.	Regular	Constant	
		Concreting	One Visit for each stage	As per IS	Following instructions of Dept. Engineer	
h	Post Construction		Two visits – one visit at finishing stage and one final visit to test for leaks.	As and when required	Constant till successfully handovering unit to the department	
	1.1 Construction of Filter Beds					
a	Site Clearance and Marking		One Visit	Regular	Constant	1st and 2nd parties confirm the levels at site as per approved design.
b	Inspection of Material		One Visit	As per IS	Following instructions of Dept. Engineer	
c	Collection Chamber	Civil Work	One Visit each at foundation stage, reinforcement stage and concreting stage.	As per IS	Following instructions of Dept. Engineer	
d	Cascade Aerator	Civil Work	One Visit	As per IS	Following	

					instructions of Dept. Engineer	
e	Alumn Dosing Tank	Civil Work	One Visit	As per IS	Following instructions of Dept. Engineer	
F	Flash Mixer	Civil Work	One Visit	As per IS	Following instructions of Dept. Engineer	
g	Clariflocculator	Civil Work	Five Visits	As per IS	Following instructions of Dept. Engineer	
		Mechanical	as required	Regular	Following instructions of Dept. Engineer	Inspection at Manufacturing is done by 3rd Party
h	Scum /Sludge Tank	Civil Work	One Visit	As per IS	Following instructions of Dept. Engineer	
i	Filter Beds	Civil Work	Two Visits for civil work and one visit each for Mechanical & Electrical works	As per IS	Following instructions of Dept. Engineer	
		Filter Media	Two visits	Regular	Following instructions of Dept. Engineer	
j	Clear Water Sump	Civil Work	One Visit each at Foundation stage, Reinforcement stage and concreting stage for slabs and side walls	As per IS	Following Instructions of Dept. Engineer	

K	Disinfection Tank	Civil Work	One Visit	As per IS	Following instructions of Dept. Engineer	
I	Pump House	Civil Work	One Visit each at foundation stage basement stage, lintel level roof level and roof casting stages.	As per IS	Following instructions of Dept. Engineer	
		Mechanical / Pumps / Motors etc	As required	As per IS	Following instructions of Dept. Engineer	Inspection at Manufacturing is done by 3rd Part
		Electrical Items	As required	As per IS	Following instructions of Dept. Engineer	Inspection at Manufacturing is done by 3rd Part
	1.2 Pipe line Laying					
a	Inspection at Factory		As per IS	Through checking at stockyard	Through checking at stockyard	3rd Party along with 1st Party visit Manufacturing Unit
b	Laying of Pipe Line	Up to 200mm dia Pipes	One visit per 1 Km	Regular	Constant	
		> 200 and up to 500mm	One visit per 500 meters			
		> 500 mm	One Visit per 250 meters			

c	Hydraulic Test	Up to 200mm dia Pipes	One Test per every 5 km	Witnessing the test	Performing the best	After performing Hydraulic Test for required length, then only further work to be taken up by the 1st Party
		> 200 and up to 500mm	One Test per every 5 km			
		> 500 mm	One Test per every 5 km			
	1.3 SS Tanks					
a	Foundation level	Foundation soil	Two Visits per week and has to check the foundation soils for their physical parameters	Regular	Constant	
b	Bund formation & revetment etc	Borrow soils	Two Visits per week and has to check the barrow soils for their physical parameters	Regular	Constant	
		Bund Formation	Test OMC & Field density for every layer for every 250 M length	Regular	Constant	
		Revetments & Stone Work	Two visits per week and has to check all physical parameters for every 250 M length	Regular	Constant	

	2 SEWARAGE PROJECTS					
a	Site clearance and marking	Up to 200mm dia Pipes	One Visit	Regular	Constant	1st and 2nd parties confirm the levels at site as per approved design
a	Inspection at factory	Foundation soils	As per IS	Through checking at stockyard	Thorough checking at stockyard	3rd Party along with 1st Party visit manufacturing Unit
b	Laying of sever line	Up to 200mm dia pipes	One visit per 500 meters	Regular	Constant	
		> 200 and up to 500mm	One visit per 500 meters			
		> 500 mm	One visit per 250 meters			
c	Water / Air Test / Ball / Velocity Test etc.	Up to 200mm dia pipes	One test per every 2 km	Witnessing the test	Performing the test	
		▪ 200 and up to 500mm	One test per every 1 km			

	3 ROAD PROJECTS					
a	Site clearance and Marking		One Visit	Regular	Constant	1st and 2nd parties confirm the levels at site as per approved design
b	Inspection of Material	Up to 3 meter width	One visit per 400 meters	As per IS	Following instructions of Dept. Engineer	1st party makes available all approved drawings at site before starting the work
		> 3 meters width	One visit per 200 Meters	As per IS	Following instructions of Dept. Engineer	
c	Laying of Roads	Up to 3 meter width	One Visit per 400 meters	Regular	Constant	
		> 3 Meters width	One visit per 200 meters			

APPENDIX C: RELEVANT CODES

The quality of material and works are checked with respect to the corresponding IS codes and APSS & MORTH Specifications.

SL No	Description	I.S.No
A)	**List of Indian Standards**	
I.	**CEMENT**	
	1.Ordinary and Low Heat Portland Cement	269-1989
	2. Pozzolana Portland cement	1489-1991
II.	**AGGREGATES**	
	1.Aggregates, Coarse & Fine from Natural resources for concrete	383-1970
	2. Sand and Masonry Motor	2116-1980
	3.Methods of tests for aggregates for concrete Part – I Particle size and shape Part – II Estimation of deleterious Material Organic Impurities Part – III Soundness 4. Specification for test sieves part –I wire cloth test sieves	2386-1963 460-978 Part – I
III	**BRICKS**	
	1.Common burnt clay building bricks	1077-1992
IV.	**STEEL**	
	1. Mild steel medium tensile steel bars and hard drawn steels wire, concrete reinforcement. Part – I Mild steel & Medium tensile Steel Bars	432-1982
	2. High strength deformed steel bars and wires for concrete reinforcement.	1786-2008
	3. High Tensile Steel for PSC Pipes	1784-1998 (Part – I)
	4. Hand Drawn Wire	432-1982
	5. Bending and Flexing of Bars for Concrete reinforcement	2502-1963
	6. Recommendations for detailing of reinforcement in reinforced concrete works.	5525-1969

SL.No	Description	I.S.No
V.	**CONCRETE**	
	1. Plain and reinforced concrete, code of practice for.	456-2000
	2. Laying in situ cement concrete flooring	2571-1970
	3. sampling and analysis of Concrete	1199-1959
VI	**MASONRY**	
	1. Brick Masonry	2212-1991
	2. Construction of Stone Masonry	1597-1992
VII	**PIPES AND FITTINGS**	
	1. Asbestos cement pressure pipes	1592-2003
	2. Concrete pipe with & without reinforcement	458-2003
	3. P.S.C Pipes (including fittings)	1343-1980
	4. Method of tests for concrete pipes	458-1988, 3597-1998
	5. Materials for M.S. Specials	226-1976 & 2062-1999
	6. Specifications for M.S. Special for P.S.C.Pipes	
	7.Specifications for steel cylinders reinforced Concrete pipes	1916-1989
	8. Methods of tests of concrete pipes	3597-1998
	9. Centrifugally Cast(spun) iron pressure pipes for water gas and sewage including fittings.	1536-2001 784-2001
	10. Specifications for Centrifugally Cast(Spun) D.I. Pipes for Water Gas and Sewage	8329-2000
	11. D.I. Fitting for pipes for water ,gas and sewage	9523-2000
	12. Dimensional requirement of rubber gaskets for mechanical joints and push on joints for the use with C.I.D.I. pipes	12820-2004
	13. C.I Specials for Mechanical and push on flexible joints for pressure pipes lines for water gas and sewage.	13382-2004
	14. HDPE pipes	IS 4984-1995

	15. BWSC pipes	IS 15155-2002
	16. UPVC pipes	IS 4985-2000
	17. GRP pipes	IS 12709-1994
	18. Horizontally cast iron double flanged pipes for water, gas and sewage	7181-1986
	19. Cast iron fitting for pressure pipes for Water, gas and sewage	1538-1993
	20. Cast iron detachable joints for use with Asbestos cement pressure pipes	8794-1988
	21. a) Rubber rings for jointing C.I pipes, RCC pipes and A.C Pipes b) Rubber rings for jointing PSC pipes	5382-1969 5382-1985
	22. Rubber rings for jointing A.C. pipes with AC coupling	10292-1988
	23. Pig lead	782-1978
	24. Hemp Yarn	6587-1987
	25. Rubber insertion to be used in jointing C.I.D.F. pipes	638-1979
	26. Bolts & Nuts to be used in jointing C.I.D.F. pipes	1363-2002
VIII	**WATER SUPPLY FITTINGS**	
	1. Sluice values for water works purposes (50 to 300mm dia size)	780-1984
	2.Sluice values for water works purposes (300 to 1200 mm dia size)	2906-1984
	3. Surface boxes for sluice values	3950-1979
	4. Manhole covers and frames , cast iron	1726-1991
IX	**LAYING OF PIPES**	
	1. Laying of asbestos cement pressure pipes	6530-1972
	2. Laying of Concrete pipes - I	783-1985
	3. Laying of Cast – Iron pipes	3114-1994
	4. Laying of PSC Pipes	126 of APSS&783-1985
	5. Laying of PSC Pipes	126 of APSS&783-1985
X	**MACHINERY**	
	1. Batch type concrete mixer	1791-1985
	2. sheep foot roller	4616-1968

XI	**SAFETY**	
	1. Safety for excavation works	3764-1992
	2.Safety code for scaffolds and ladders Part- I- Scaffolds. Part – II – Ladders	3696-1987 (part- I) 3696-1991 (part – I)
XII	**Earthwork and formation of S.S. Tanks**	
	1.Method of test of soils for suitability of soil for embankment of S.S. tanks	2720-1975 to 1987 Part II to XII,XV XVII, XX, XXIX And 1228-1988
	2. Code of practice for Drainage System for Earth and rock fill dams	9429-1999
	3. Filters materials Requirement	9429-1980 & 10379-1982
	4. Earthwork and formation of embankment for S.S. Tanks	Sec.3 of ApSS Sub-sec. 301,303
	5. Morrum (gravel) bracking to rough stone dry packing and gravelling to top and side slope of bunds 150mm thick	Sub- sec 621of Sect.VI of APSS To 307
	6. Rough stone dry packing aprons and revetments	Seub – sec 621 of Sec . 6 of APSS
XIII	**FILTERATION PLANTS WITH DUAL MEDIA AND TUBE SETTERLS.**	
	1.Guide lines for flauculator devices	7208-1992
	2. Guide lines for rapid mixing devices	7090-1985
	3.Recommendations for handing and dousing devices for chemicals for water treatment	9222-Part- I 1990
	4. Requirements for Chlorination Equipment	10553-1983 (Part – I)
	5. Recruitments for settling tank(clarified equipment for water treatment plant	Part – IV 10313-1983
	6. Requirements of water Filtration equipment	8419-77 Part- I Part –II -1984

SL.No	Brief Description of Item	APSS/MOST Nos
1	Providing Gravel Base at OMC to Obtain 98% Proctors Density	138, 1503 to 1505 and 1516 of APSS
2	Providing Laying, Spreading and Compacting stone Aggregates (Graded Metal)	108, 1506 of APSS
3	Cleaning of existing WBM surface	502 & 502.4 of Most
4	Cleaning of Existing B.T. surface	502.4.2 of Most
5	Providing and applying tack coat over Prepared surface	503 of Most
6	Providing and Laying Bituminous Macadam	504 of most
7	Providing and laying and consolidation of crushed stone Aggregate as per Built up spray Grout	1507 of APSS and 506 of Most
8	Providing and laying single coat surface dressing	508 of Most
9	Providing and laying open Graded premix Carpet	509 of Most
10	Providing and laying mix seal surfacing	510 of Most
11	Providing laying, Consolidation semi dense Bituminous Concrete	511 of Most
12	Providing laying B.T Surface Dressing/ B.T Wearing Coat	1510 of APSS
13	Providing laying Bituminous seal Coat with 6mm chips	1512 of APSS
14	V.C.C for Abutments, piers and Wing walls	402 of APSS
15	VRCC for Wearing Coat	402, 403 of APSS
16	Providing HYSD Fe 415 Grade Bars/ Mild Steel Fe 250 Grade Bars	126 of APSS
17	C.R.S Masonry for Abutments and piers	601, 612 of APSS
18	Flush Pointing to CRS Masonry	906 of APSS
19	Collection of Metal Road Works	1506 of APSS
20	C.C Roads	1515 of APSS