


CENTRE FOR CAMPUS MANAGEMENT AND DEVELOPMENT INDIAN INSTITUTE OF SCIENCE BANGALORE		Telephone: 22932202/2203 Telegrams: "SCIENCE" Telefax :91-080-2600683/2360085 E-mail: estate@admin.iisc.ernet.in jr@admin.iisc.ernet.in
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CCMD/AR/SR/2018-21

13th March 2018


NOTIFICATION FOR REGISTRATION OF AR/SR CONTRACTORS FOR IISc CAMPUS BANGALORE

AND CHALLEKERE CAMPUS (First time registration)

The Indian Institute of Science, Bangalore is intended to have **REGISTRATION OF CONTRACTORS of above category** for a period of **THREE** Years (1st April 2018 – 31st March 2021). Applications are invited from the Registered Contractors of KPWD/CPWD/MES. Those who are interested to Register shall satisfy the following conditions.

Sl.No.	Particulars			
1.	The agency should have Registered in KPWD/CPWD/MES/ELECTRICAL INSPECTORATE for CIVIL/ELECTRICAL as applicable			
2.	The agency shall have experience in Construction and Maintenance of Buildings, Annual and Special repairs, Additions Alterations etc., in KPWD Government/Aided Institutions/or any other similar institutions.			
3.	The selected agency shall produce the renewed Registration Certificate (i.e. after 01.04.2018) before issuing the Order for Registration otherwise the application admitted at the time of Registration stands cancelled/Rejected.			
4.	The selected agency shall deposit the revised fee/deposit as follows:			
	IISc Campus	Registration fee of Rs.25,000/- (Non refundable)	Challekere Campus (First time registration)	Registration fee of Rs.10,000/- (Non refundable)
		Security Deposit of Rs.2,00,000/- (Rupees Two Lakhs only (after selection)		Security Deposit of Rs.50,000/- (Rupees Fifty thousand only (after selection)
5.	Decision of the Institute authorities regarding selection of Agency for Registration is final.			
6.	The agencies intend to apply shall enclose proof of evidence for the class of Registration and execution of works.			
7.	The interested agencies shall go over to the website http://iisc.ac.in/business-with-iisc/tenders/ and download the application and other enclosures and apply as per guidelines.			
8.	The last date for submitting the filled application form is 28th March 2018			
9.	For further details please contact office of the CCMD, Indian Institute of Science, Bangalore-12			

REGISTRAR

CENTRE FOR CAMPUS MANAGEMENT AND DEVELOPMENT INDIAN INSTITUTE OF SCIENCE BANGALORE		Telephone: 22932202/2203 Telegrams: "SCIENCE" Telefax :91-080-2600683/2360085 E-mail: estate@admin.iisc.ernet.in jr@admin.iisc.ernet.in
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APPLICATION FORM FOR REGISTRATION OF CIVIL/ELECTRICAL
 CONTRACTORS FOR AR/SR AND OTHER MINOR WORKS
 IN THE INSTITUTE /CHALLEKERE CAMPUS (*First time Registration*)
 FOR A PERIOD OF THREE YEARS FOR THE SESSION
1st April 2018 to 31st March 2021

SI.No.	PARTICULARS	Details to be filled by the Agency
1.	Name of the Agency (In block letters)	
2.	Name of the Owner/Partners	
3.	Permanent Address
4.	Contact Address
5.	Person(s) who would be available for contact with landline and Mobile Phone Numbers (<i>details of Constitution of agency-sole Proprietorship/partnership</i>)

6.	Qualification	
	a) General	
	b) Technical	
7.	Name of reference and their addresses <i>(These shall be the current clients and clients in the past two years)</i>	1)
		2)
		3)
8.	Name of the Banks of Operation/ Branch/Address	
9.	Credits at Accounts	
10.	Value of work you can attend at a time	

11.	Certificate to be provided:	
	a) KPWD/CPWD/MES/Railway Registration/any other registration and class	
	b) Qualification	
	c) Work Experience	
	d) Tax Clearance certificates (IT, VAT, GST etc.) for past three years.	
12.	Earnest Money Deposit of Rs.1,00,000/- in the form of Demand Draft drawn in favour of Registrar, Indian Institute of Science, Bangalore (DD to be enclosed).	
13.	Any other details you would like to furnish (enclosures if necessary)	

1) Special Conditions for AR/SR Contractor Registration

- a) No labour camps
- b) No permanent Store Site
- c) Demolition building material/debris will not be disposed on campus
- d) All contractor should have dedicated Staff/and computer/printer for generation of Bills/ Invoice/measurement checks etc.
- e) Any contractor with a track record of delayed completion of work will **not** be considered for empalment.
- f) Any major/minor maintenance Complaint received should be attended with in 3 days maximum.
- g) The agencies should have a supervisor working under him to supervise all works.
- h) Whatever the nature and cost of work. The agency must carryout the work without any delays, repeated refusal for more than three times, notices may lead to action to terminate the agreement from AR/SR registration.
- i) All agencies must have and E-mail Id and the complaints will be forwarded through mail and the same should be responded without fail.
- j) The agencies must furnish their E-mail ID's to the Estate Office.
- k) The agencies must provide uniforms to all the supervisors working under them with jackets displaying on duty from CCMD or Logo as specified identity cards, personal protection equipment required for tradesmen.

2) Additional Conditions for Electrical Contractors

a.	The contractors should be well versed with Electrical System of R & D Institutes, Hostels, Departments and Housing System and at the working voltage of 440V 3 phase system. The contractors should also be familiar with water pumping station electrical system, electrical system of STP's and Effluent treatment plants.
b.	The contractor should have the licence issued in his name by the Chief Electrical Inspector, Government of Karnataka.
c.	The contractor should have the Supervisor under him at least with minimum qualification of Diploma in Electrical Engineering/Supervisory permit holder issued from Chief/Deputy Electrical Inspector, Government of Karnataka.
d.	The contractor should have the wiremens electricians, permit issued by the Deputy Electrical Inspector, Electrical Inspector from Government of Karnataka.
e.	The contractor should have proper tools and plants like Megger, Earth tester, Multimeter, tongue, tester etc and all other tools and plants required for electrical works.
f.	The contractor should provide Mobile number/Alternate Mobile numbers/e-mails/Fax etc. for IISc. Communication.
g.	The electrical contractor should have literate wireman's to understanding capacity of connecting wires and identifying the electrical faults and rectifying the same at the minimum time and keep the electrical system safe and foolproof.
h.	The contractor should provide proper tools, tool bags to the wireman's working in the field and knowledge of using the tool properly.
i.	The contractor should provide the previous work experience certificates in any other Institutions, Departments and other places where he has worked earlier.
j.	Police Verification certificates of contract staff on submission of Aadhar Card and Residential Address.

3) **CONDITIONS OF CONTRACT**

- a) Contractor can be asked to execute any item of work as listed in KSR. 16-17 (Civil) and KSR (14-15) as amended from time to time.
- b) General rules as Direction to Contractors (**Appendix**)
- c) Registration of contractor is liable to be cancelled in the event of poor quality of work, inspite of repeated notices/warnings, submission of fake Invoices/Challans/Bills, abandoning of ongoing works, fraudulent billing etc.
- d) Application for IISc, Bangalore and Challekere campus should be submitted in separate envelop. The envelop should be appropriately endorsed.

SIGNATURE

NAME OF THE CONTRACTOR

.....6/-

11. Details of work done for the past three years: Base year 2014-15, 2015-16 & 2016 - 17

Sl. No.	Name of the Employer	Description of work	Value of work	Date of work order	Ramarks, explain reasons for delay, if any

Enclosure Satisfactory Certificate issued from the concerned Executive Engineer.

Date:

SIGNATURE OF THE CONTRACTOR

.....7/-

12. EXISTING COMMITMENTS AND ON GOING WORKS:

Sl. No.	Description of work	Name & Address of Employer	Value of work Rs.	Vale of works remaining to be completed Rs.

Date:

SIGNATURE OF THE CONTRACTOR

.....8/-

13. LITIGATION RECORD OF CONTRACTOR :

Sl. No.	Name of the work	Nature of Litigation	Amount	Main Legal issues	Result

Date:

SIGNATURE OF CONTRACTOR

.....9/-

DECLARATION

I, We, Mr/M.s _____

do hereby agree to strictly abide by the rules and directions mentioned above.

Place: Bangalore

Date:

SIGNATURE OF THE CONTRACTOR

Address:

GENERAL RULES AND DIRECTIONS TO CONTRACTORS

1. A Schedule of Quantities (Bill of Quantities) is attached herewith. It should however, be clearly understood that these quantities are liable to alterations by omission, addition or variation, at the discretion of the Architects/Project Engineer Cum Estate Officer..
2. The tenderer shall insert all rates and amounts and the totals in the schedule of quantities. Rate for alternative items, when asked for, shall be entered in red ink and shall not be included in the total.
3. The drawings together with specifications and conditions of contract are enclosed. These should be studied carefully by the intending tenderers. In the absence of specifications for any item of work, material or ingredient in the specifications, PWD specifications shall be followed and in the absence of specification for any item, materials are ingredient shall be fixed in all respects in accordance with the instructions and requirements of the Project Engineer Cum Estate Officer, the work will be the best of the kind.
4. The tenderer is expected to inspect the site and acquaint himself with the local conditions and will be deemed to have so done before submitting the tender.
5. The successful tenderer is required to sign an agreement for the due fulfillment of the contract and start the work immediately on of the acceptance of his tender. A draft of the Articles of the Agreement is enclosed. The Earnest Money referred to in item No.3 of Memorandum contained in the “Item Rate Tender for Works”, will be forfeited and at the absolute disposal of the Employer if the Contractor defaults from signing the Agreement of in starting the work.
6. The rates quoted shall be for finished work and shall include for all necessary incidental work. Sales or any other tax on materials in respect of this contract will be payable by the Contractor. The Contractors cannot presume any details regarding the contract.
7. Water supply: The Contractor has to make his own arrangement for water supply. However,, if water supply to the site at one convenient point is made available by the Institute, the charges for the consumption of water will be borne by the Contractor at 1.50% of the value of the work.
8. Supply of Electricity-electricity required for construction shall be arranged by the contractor itself. Electricity if supplied to the contractor by the institute will be metered and amounted will be recovered in the bills as per actual at rate fixed by the Institute. Supply of electricity from the institute is not mandatory. Non supply of electricity by the institute cannot be held as reason for short fall in progress.

9. The duration of the work is **3 (Three) Years.**
10. Institute reserves the right to accept or reject any tender without assigning reasons thereof. He further reserves the right of deleting any item of work in this contract at his discretion.
11. The tenders are valid for a period of 3 (three) months from the date of opening.
12. This “General Rules and Directions to Contractors” shall also form part of the tender document.
 - 12.1 Cement to be procured by contractor only, adhering to the following conditions.
 1. Only 53 grade OPC cement is to be used for the projects.
 2. The cement shall conform to IS 8119-1976.
 3. ACC, L&T, Coromandel, Birla brands only to be used.
 4. Test certificate is to be produced for every procurement made for.
13. This contract comprises:
 - a)General Builders work (Civil works).
 - b)Water supply and Sanitary installations.
 - c)Electrical Installations.
 - d)Sump and overhead tanks.
14. The General Builder should get the water supply and sanitary installations and the Electrical installations executed through licensed sub-contractor having good experience and qualified and competent tradesmen in the respective fields and approved by the Project Engineer Cum Estate Officer.
15. It is entirely the responsibility of the Contractor to arrange for and provide all materials required for successful completion of the work except such special materials that may be supplied if any.
16. The Brand, size and colour of vitrified/ceramic/glazed tiles shall be got approved from the Competent authority before procurement of materials.

Brands recommended are Johnson, Naveen, Kazaria.
17. Water supply/Sanitary fixtures like Bibcocks, pillarcocks, Health-faucet, anglecock, bottle traps, EWC, IWC, urinal basins shall be as per approval from competent authority.

18. Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows
 - a) Where there is discrepancy between the rates in figures and in words, the lower of the two will be governed and
 - b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will be governed.
 - c) Where there is a discrepancy in entries of unit rate between the Original and Duplicate, the lower will govern.
19. Tol tax, Octrai, Royalty for collecting earth, gravel, sand stone etc., Excise duty, GST, Sales tax or any other tax payable on account of this contract will have to be met from contractors account.
20. The Contractor should make his own arrangements to cover the all-round construction area, by providing polyester net/polythene sheet/barricading to avoid inconvenience to other surrounding departments, as directed by the Engineer-in-charge of the work.
21. The debris arise during the period of construction will have to be cleared then and there to keep the surroundings clean and tidy. Such debris shall, if not cleared, be cleared at his risk and cost.
22. Work done as a sub- contractor under a prime contractor will not be considered for qualification.
23. "Prime Contractor" means a firm that performs a construction work itself and that the work is directly entrusted to the firm by the owner/ government/ local body/ quasi government/ Government undertaking bodies.
24. The contractor shall vacate the campus premises with all his men/ materials immediately after completion of the project.

GENERAL SPECIFICATIONS

PART -1 Specifications for Civil Works

1.0 EXCAVATION

- 1.1 The places where excavation is directed to be done shall be cleared of all shrubs, weeds, grass and vegetation including roots, where necessary and if so directed, the excavated earth must be deposited in layers of 15 cms and the clods broken. During excavations, if so directed, 'dead-man' (of volume not more 5% of the excavation volume shall be left at the places directed for verification of the dimensions of excavation). These 'dead-man' shall be removed and earth deposited at places shown before full rate is paid, Alternatively or in addition to 'dead-man', block level at intervals as directed will be jointly taken and recorded by the contractors representative and employer's representative before starting of excavation and after completion. Recording of – block levels or leaving of 'dead-man' may be avoided in the case of narrow foundations and trenches, if so directed.
- 1.2 The rate quoted shall include bailing or otherwise removing all water which may accumulate in the excavation from all causes and removing of swish, trimming of all sides plumb or otherwise as directed, dismantling removing and stacking as directed any existing water pipes and or soil pipes etc., encountered within the excavation.

2.0 CONCRETE WORKS

- 2.1 Proportion of ordinary cement concrete will be expressed as 1:4:8, 1:3:6, 1:2:4 etc., The first figure will be quantity of ordinary Portland cement by volume, the second figure will be dry coarse sand (fine aggregate) by volume and the third figure will be the quantity of coarse aggregate by volume. Cement shall be measured by weight. The weight is to be derived on the basis that one cubic meter will weigh 1440 kg or one full bag of 50kg will be assumed to be 35 lts. When the sand is wet or moist suitable corrections for bulking is to be given while proportioning. The clerk of works may allow measuring cement by volume.
- 2.2 Unless otherwise specified, the rates for all RCC will be exclusive of reinforcements but including from work, Reinforcements will be measured and paid separately.
- 2.2.1 Unless otherwise stated for all RCC work the size of coarse aggregate will be 20MM and down size.
- 2.2.2 Concrete proposed for roof slab and roof beams is ready mixed concrete. The contractor should quote, his rate keeping in view that the rate should include for ready mixed concrete all as per specifications and directions of Engineer-in-charge.

2.3 READY MIXED CONCRETE (RMC) IS: 4926-1976

- a. The RMC from suppliers of ACC/L & T/Fleteher challenge should only be used.
- b. The rates are inclusive of all lead and lift. Additional lead and lift charges.
- c. The rate is inclusive of all necessary form work, centering and scaffolding capable of withstanding pumping of concrete.
- d. The rates are applicable to the materials with a maximum radius of 25 km from the city center.
- e. Test results of concrete for 28 days strength be obtained from the concerned RMC supplying firm.

2.4 MATERIALS.

2.4.1 Cement:-

2.4.1.1 Cement shall comply in every respect with the requirements of the latest publication of IS: 269 and unless otherwise specified, ordinary Portland cement shall be used. No other make of cement but that approved by the Architects/ Employers will be allowed on works and the source of supply shall not be changed without approval of the Architects/Employer in writing test certificates to show that the cement used fully complies with the relevant IS specifications shall be submitted to the Architects/ Employer and not withstanding this the architects may at their discretion order that the cement brought to site and which they may consider damaged or of doubtful quality for any reasons whatsoever shall be rested in an approved testing laboratory and fresh certificate of its soundness shall be produced, Cement ordered for retesting shall not be for any work pending results of retest.

2.4.1.2 Cement shall be stored neatly packed in piles not exceeding 10 bags high in weather-proof sheds with raised wooden plank flooring to prevent deterioration by dampness or intrusion of foreign matter. It shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt, i.e., the first received being first used. Cement deteriorated and/or clotted shall not be used on work but shall be removed at once from the site daily record of cement received and consumed shall be maintained by the contractor in an approved form and a copy submitted to the employer once a month.

2.4.2 Fine Aggregates:

2.4.2.1 Sand shall conform to IS: 383 it shall pass through IS sieve 4.75mm (3/ from a 16" B S) test sieve, leaving a residue not more than 5%. It shall be from a natural source or crushed stone screedings it shall be washed, if directed, to reduce the percentage of deleterious substances to acceptable-limits. Sand

shall not contain any trace of salt and sand containing any trace of salt shall be rejected.

- 2.4.2.2 The fine aggregate for concrete shall be graded within limits as specified in IS: 383 and the fineness modules shall range between 2.60 to 3.20 the fine aggregates shall be stacked. Carefully, on a clear hard dry surface so that will not get mixed up with deleterious foreign materials. If such a surface is not available, a platform of planks or corrugated sheets or brick floor or concrete floor shall be prepared. Sand shall be added in the desired proportion as required for the strength specified, with suitable correction for “bulking”.
- 2.4.2.3 Coarse aggregates: Coarse aggregate shall conform to IS:383. It shall consist of crushed or broken stone, 95% of which shall be retained on 4.75 mm IS test sieve. It shall be obtained from crushed granite, trap, basalt or similar approved stones from approved quarry. Coarse aggregate shall be chemically inert when mixed with cement and shall be angular in shape and free from soft friable thin porous laminated or flaky pieces. It shall be free dust and other foreign matter. – Gravel/shingle of desired grading may be permitted as a substitute in part or full in plain cement concrete if the Architect/Employer is otherwise satisfied about the quality of aggregate.

2.5 MIXING OF CONCRETE:

- 2.5.1 Machine mixing:- Aggregates shall be accurately measured out in boxes and mixed dry along with required cement. Water shall then be added in measured quantity and mixing shall be continued until there is uniform distribution of the materials and the mass is uniform in colour and consistency but in no case shall the mixing be done less than two minutes. Only hopper loading mixer shall be used.
- 2.5.2 Hand mixing: when hand mixing is permitted with the approval of the Project-Engineer – Cum – Estate Officer, CCMD, it shall be carried out in water tight, mixing platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. If required by, the architect/consultant 10% extra cement has to be used at the contractor’s cost if hand mixing is done.

2.5.3 Consistency:

- 2.5.3.1 Only sufficient water giving due allowance for the moisture content of aggregate shall be added to the cement and aggregate during mixing to produce a mixture of sufficient workability to enable it to be well consolidated to be worked in to corners of the shuttering and around the reinforcements (where there is reinforcements) to give the specified finish and to have the specified strength.

2.5.3.2 Normally for every 50 kg of cement in the concrete in the mix, total water including moisture content of aggregate should not be more than 34 lts for 1:3:6 mix, 32 lts for 1:2:4 mix 30 lts for 1:1 ½ :3 and 27 ltrs for 1:1:2 mix

2.5.3.3 If difficulty be experienced in placing concrete of specified mix and approved consistency between and below reinforcement bars, in the bottom of beams and similar situations, the concrete shall have improved workability by increasing the proportion of water with corresponding additional quantity of cement using aggregates of smaller size than specified as directed by the Architect/ Employer for which extra will be paid.

2.5.3.4 The consistency shall be determined by making trial mixtures with dried aggregates, or. When so instructed by test laboratory made test cubes under the direction of Architect/ Employer by slump – Test using a standard cone or the Architect/Employer may direct the use of any other means of testing the consistency.

2.5.3.5 If the apparatus used for the slump test is a standard cone, the cone when filled, shall be raised vertically – clear of the concrete: The ‘slump’ shall be 300mm minus the height of the slumped cone of concrete. Care shall be taken to prevent vibration of the samples being tested. The following slumps shall be adopted for different kinds of works:

		With Vibrator	Without Vibrator
A	Mass concrete in RCC foundations, footings and retaining walls	10 to 25mm	80 mm
B	RCC beam, slabs and columns	25 to 40 mm	100 to 125 mm
C	Thin RCC section or section with congested steel	40 to 50mm	125 to 150mm

2.5.4 Placing and Compacting

2.5.4.1 Method of placing concrete shall be such as to preclude segregation and as far as practicable the placing shall be continues.

2.5.4.2 Special care shall be taken in accordance with 18:456 while laying concrete under extreme weather. Concrete, during the operation of placing shall be thoroughly worked around the reinforcements, embedded fixtures, spaded against comers of the form work by punning, rodding or by any other approved means and thoroughly compacted by mechanical vibrators. The number and type of vibrator to be used, and in general immersion type vibrators shall be used.

2.5.4.3 Consolidation by using immersion vibrator will be in accordance with Is: 3558 sufficient number of reserve vibrators in good working condition shall be kept

on hand at all times, so as to ensure that there is no slacking or interruption in compacting.

2.6 ADMIXTURE

The use of admixtures may be allowed only if approved by the Architect/Consultant their decision in this regard shall be final.

2.7 TRANSPORTING

Concrete shall be conveyed from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of any of ingredients? If segregation does occur during transport the concrete shall be remixed before being placed, normally not more than 30 minutes shall lapse between mixing and consolidation in position.

2.8 CURING:

All cement concrete after laying shall be protected from damages, till it sets and shall be cured thereafter for not less than ten days. The work shall be protected from direct wind and direct sun, rays. Water used for curing shall be free from sediments of any kind and generally fit for drinking.

2.9 STRENGTH OF ORDINARY CONCRETE:

2.9.1 The Contractor has to ensure that proper- materials in specified proportion are used and the correct water cement ratio, just sufficient for the workability is maintained to see that the minimum strength of concrete as provided under paragraph 3.9.2 (below) are obtained. To verify this, test cubes from the concrete pours should be made and tested. The frequency of testing and the acceptability criteria will be according to IS: 456.

2.9.2 Compressive strength of 15 cm cubes at 28 days after mixing shall be as follows: same as para 3.13.2

2.9.3 Six cubes shall be taken from any mix selected at random as directed by Engineer-in-charge three of these should be tested after 7 days and three after 28 days. The strength at 7 days must be 2/3 of the strength at 28 days. The criteria for acceptance are only the strength at 28 days.

2.10 FORMWORK AND CENTERING

2.10.1 The form: work shall conform to the shape, lines and dimensions of the faces of concrete shown on the drawings and be so constructed as to remain sufficiently rigid the placing and compacting of the concrete and shall be sufficiently water tight to prevent loss of cement slurry from the concrete. Form work shall be constructed of steel or timber or marine plywood and adequately designed to support the full weight of wet concrete (deflection

limited to 3mm) and retain its form during laying, consolidation and setting of concrete. Timber used shall be properly seasoned so as to prevent deformation when wetted.

- 2.10.2 Props shall be straight and of full height and no joints shall be allowed. Props shall be braced with bamboo's or wooden battens or other means in both directions at intervals of 1500mm and where additional staging is necessary, extra care shall be taken to use bigger size props with bracing at necessary levels. All the props shall be supported on sole plates double wedged. At the time of removing props these wedges shall be gently eased and not knocked out.
- 2.10.3 All rubbish, chipping, shavings, sawdust etc., shall be removed from the interior of the forms before concrete is placed. The form work in contact with the concrete shall be cleaned and thoroughly wetted and treated with non staining mineral oil or any other approved material. Care shall be taken that "oil or such similar material is kept out of contact with the reinforcement.
- 2.10.4 Officer, GGMD at convenient places for washing down all the rubbish. These are to be closed before concreting.
- 2.10.5 All form work shall be removed without shock or vibration and shall be eased off carefully in order to allow the structure to take up its load gradually. Forms shall not be disturbed until concrete has adequately hardened to take up its own weight and superimposed load coming on it and in no circumstances shall forms be struck until the concrete reaches its strength of at least twice the stress to which the concrete may be subjected to at the time of striking. The said forms shall be so fixed that while removing them the supporting forms and props are not disturbed.
- 2.10.6 In the case of folded plates and shell roofs the contractor should take prior approval of the pattern of centering and shuttering along with programme for deshuttering.
- 2.10.7 The tolerance of shuttering and stripping time will be as set forth in IS : 456 if directed, forms shall be given an upward camber to ensure that the beams do not have any sags. No honey combing will be permitted, however any honey combing of minor nature as specifically allowed by the clerks of works shall be repaired neatly with cement mortar 1:2
- 2.10.8 Any work showing signs of damage through premature or careless removal of centering or shuttering, shall be reconstructed by the contractor at his own cost. Surface that has to remain exposed after removal of forms shall be carefully examined and any fins, burrs, projections etc., that are detected shall be removed.
- 2.10.9 Centering and shuttering is specified to be paid for separately, measurement of such centering and shuttering will be taken according to IS: 1200

2.11 Steel Reinforcement

- 2.11.1 Reinforcement for all works shall be TMT steel bars, as specified in the drawings. TMT steel bars shall be of tested quality conforming to grade I of IS : 432 and high yield strength (of 550 N/sqmm) TMT bars shall be of IS:1786 or 1139 as appropriate. Reinforcement where called for shall be kept clean and free from pitting, loose rust millseale- oil, grease- earth paint or any material which may impair the bond between concrete and reinforcement or which may cause high corrosion of the reinforcement or deterioration of the concrete.
- 2.11.2 Reinforcement shall be accurately done to the dimensions, spacing and minimum cover as per structural drawings. The contractor shall submit to the clerk of work bar bending schedules, prior to the commencement of fabrication. All joints in TMT reinforcement upto and including 16mm dia shall be overlapped. The length of overlap for tension and compression joints in TMT steel reinforcement above 16mm dia may be welded subject to the approval of the project Engineer- cum estate officer.
- 2.11.3 Wherever specified and / or approved, welded laps shall be provided subject to the following.
- 2.11.3.1 Random samples of typical – welded joints shall be made and got tested in an approved laboratory at the contractor’s expenses.
- 2.11.3.2 If the cold twisted deformed bar has an untwisted end at lapping joint, such portion – shall be cut off prior to welding.
- 2.11.3.3 bars shall be free from rust at the joints to be welded.
- 2.11.3.4 Bars can be aligned and kept in proper axis in order to minimize crookedness in bar welding.
- 2.11.3.5 Nothing extra shall be payable towards lap welding of joint unless specifically mentioned or agreed otherwise.
- 2.11.4 Reinforcement shall be rigidly held in place inside the form work using chairs (bent from steel bars) spacer bars and cement concrete blocks each block shall be secured to the reinforcement with wire or clip embedded in the center of block so that it shall not be in contact with form work. Insterctions of reinforcement shall be bound together with 18 guage annealed soft iron binding wire.
- 2.11.5 Before proceeding to place reinforcements the contractor shall ensure that appropriate cover between the bars and or the form work is available. Should any difficult arise during the placing of steel in obtaining the required cover the contractor shall immediately draw the attention of the architect/

consultant to the difficulty and shall carryout such corrective measures as the architect/ consultant may instruct.

2.11.6 Reinforcement left projecting from newly placed concrete shall be supported in a way there is no risk of disturbance, which would cause damage to newly placed concrete.

2.11.7 The contractor shall ensure that movement of men and material subsequent to fixing in position of the reinforcement is organized such that displacement of the reinforcement will not occur.

2.11.8 The measurements recorded for reinforcements shall be including all laps and wastages as approved by the project Engineer- cum Estate officer's representative.

2.12 INSERTS IN CONCRETE

The contractor shall fix all necessary inserts such as steel – plates, pipes, sleeves, bolts etc., and shall make provisions in the form work for holes, pockets dowels, etc., at no extra cost (unless otherwise specified) to enable, subsequent fixing of supports, brackets or similar items. He shall also ensure that all conduits, inserts etc., are in position before placing concrete.

2.13 CONTROLLED CONCRETE

2.13.1 Controlled concrete shall be taken to mean that there shall be full field control of(a) predetermined grading of all aggregates that go into concrete and (b) Predetermined proportion of coarse aggregate, fine aggregate, cement and water for the required strength.

2.13.2 Strength shall mean the acceptable field strength after 28 days of curing on the tests conducted on 15 cm cubes from concrete taken during concreting in the manner set if forth in IS 456. A statement to acceptable minimum field strength is noted below.

Compressive Strength		
Grade	Preliminary test (Kg/ Sq Cm)	Work Test (Kg/Sq Cm)
M10	135	100
M15	200	150
M20	260	200
M25	320	250
M30	380	300
M35	440	350
M40	500	400

2.13.3 Arrive at the proportion to be adopted to obtain the grade of concrete, the mix should be based on laboratory tests conducted using the aggregate actually available at site which would be used for making/ concrete. The design mix should give suitable workability to enable it to be well consolidated to be worked into the corners of the shuttering and around the reinforcement.

2.13.4 Where difficulty is likely to be encountered in placing and compacting concrete and where there is crowding of reinforcements a separate mix is to be designed for required strength and used without extra cost, the mix design along with the workability obtainable with the designed mix should be furnished to the architect/employer before hand approval obtained. A laboratory is to be established at site to assess the moisture content of aggregate as frequently as necessary and as instructed by the Architect/employer based on which corrections is to be applied to the quantity of water to be used for mixing.

2.13.5 All aggregates are to confirm strictly to IS: 383. The aggregates will be tested as frequently as directed by the Architect/Employer to see that their specifications is the same as adopted in the mix design they must be stored on clean plat form made for the purpose.

2.13.6 Concrete shall be weigh batched, Dials of weigh batching unit to be used shall be checked with standard weights periodically. The conversions of weights volume will be allowed by Project Engineer cum Estate Officer, under special circumstances. Despite the design for several, mixes the following quantities of cement are the minimum to be used per cubic meter of the different grades of concrete.

Sl No	Grade of Concrete	Cement/ Cum (Bags)
1	M5	3.20
2	M7.5	3.60
3	M10	4.40
4	M15	4.80
5	M20	6.40
6	M25	6.80
7	M30	7.20

3.0 SIZE STONE MASONRY

- 3.1 Size stone shall be hard granite, basalt or trap stone obtainable from approved quarry, the stones shall be clean and wetted before they are used
- 3.2 Height of each course shall not be less than 15cm and all courses shall be of uniform height.
- 3.3 No face stone shall be less in depth than in height or shall tail into the work to a length less than the height stone shall break joints at least half the height of course faces of stones shall be hammers dressed such that the buildings are not more than 25mm thickness of joints shall not be more than 20mm. Edges of face stones of exposed faces shall be chiseled true to both longitudinal and vertical lines exposed faces of corner stones are to be two lines dressed 50mm wide.
- 3.4 Bond or through stones shall be provided not exceeding 2.0m apart in each course and shall be staggered bond stone shall be from the front to back of the walls fro walls upto 60cms thick; they shall either be in one piece (if available locally) or be in the series of headers; each header overlapping the adjoining one by not less than 150mm bond or through stones shall be marked as directed to enable easy detection even after having been built in position. The interior (or filling) shall be with flat bedded stones laid in mortar joints and shall not exceed 10% of the quantity of stone masonry. Care is to be taken that no dry work or hollow spaces shall be left anywhere in the masonry.
- 3.5 The work shall include.
 - 3.5.1 All scaffolding – platforms, staging etc.,
 - 3.5.2 Hacking and roughening of concrete or other surfaces for binding of the masonry.
 - 3.5.3 Raking out joints for plastering and / or pointing.
 - 3.5.4 Levelling up and preparing and pointing.
 - 3.5.5 Building in holdfasts or similar inserts.
 - 3.5.6 Keeping (the work) in damp condition for two weeks
 - 3.5.7 Construction watery situation.

4.0 BRICK MASONRY:

4.1 GENERAL

- 4.1.1 All brick work should be carried out as shown on the drawings with set backs, projections, cuttings, toothings etc., wherever the proportion of cement mortar has not been specifically mentioned, cement mortar in the proportion of 1:6 shall be used. Flat brick arches shall be provided, wherever required, without any extra cost. Brickwork shall be kept wet while in progress till mortar has properly set. On holidays or when the work is stopped top of all unfinished masonry shall be kept wet, should the mortar be dry, white or powdery, due to lack of curing work shall be pulled down and rebuilt at the contractors expense.
- 4.1.2 Table moulded bricks shall be locally available or brought from outside first quality having a minimum crushing strength of 40kg per sqcm and water absorption not more than 20% by weight. Bricks shall be thoroughly cleaned and well wetted. Table moulded bricks shall be soaked for atleast 12 hours in fresh water before being used on the work.
- 4.1.3 Unless otherwise specified, brickwork shall be done in English bond with frog upwards. The bricks shall be bedded and joined with mortar in such a manner as not to leave voids. Each brick shall be correctly into position by tapping with the handle of trowel. Grouting of mortar slurry will not be allowed except where necessary for special reasons and in such cases, prior permission of the Architect/ Employer shall be obtained.
- 4.1.4 A care shall be taken that each course of brick work is truly horizontal and perfect in bond and the face of the wall is straight, plumb and even. The mortar joints shall be 10mm in thickness, except where extra thickness is required for the purpose of bringing the work to the required height or level. Halfbricks or bats shall not be used except for obtaining the bond and where absolutely necessary.
- 4.1.5 Brickwork in 239 mm wall: If bricks are of size such that the width of the header course does not come equal to the width of the stretcher course, the difference shall be made up during construction of brickwork itself by same mortar as used for construction of masonry to provide a plane vertical surface. The surface should also be scarified to receive plaster.
- 4.1.6 All junctions of wall shall be carefully bonded into the main walls. The rate of laying masonry will be upto a height of 100cm per day if cement mortar is used greater heights may be built only if permitted by the Project Engineer-Cum Estate Officer.
- 4.1.7 During rains, the work shall be carefully covered to prevent mortar from being washed away. Should any mortar or cement be washed away the work shall be removed and rebuilt at the contractors expense.

4.2 HALF BRICK WORK:

This shall be set in cement mortar as specified. Unless otherwise specified, the walls be reinforced with 2 nos of 6mm mild steel bars with tie bars at 1m interval on the top of the first course and at every fifth course thereafter. The cost of the half brick work shall include the cost of reinforcement where reinforcement of half brick walls is specified.

5.0 Wood Works:

5.1 GRP Door shutters as per the Engineer-in-charge/ Architects approval

5.2 GLAZING WORKS

All glass shall be specified in the drawings and schedule of quantities and free from air bubbles, specks and scratches or other defects. All glass shall be cut to fit the sashes or other members as required. All glass, shall be properly bedded, securely fixed and finished as indicated on the drawings. T.W beading moulded as specified shall be provided for fixing the glass. No glazing shall be complete until all the stains and marks have been removed from the surface of glass.

6.0 ALLUMINIUM DOOR, WINDOWS ETC.,

6.1 GENERAL

6.1.1 These shall be custom-built units of approved established manufacturer using standard aluminum alloy extruded sections generally conforming to the relevant basic concept drawings of the Architects and Schedule of quantities including necessary glazings, fittings, fastenings, locking arrangements polysulphide sealants etc., to ensure water tightness.

6.1.2 Based on the Architects concept drawings, the contractor shall submit detailed fabrication/ assembly/ erection drawings for the approval of the Engineer-in-charge. Samples of each unit, based on the approved fabrication and assembly drawings shall be made by the contractor and got approved by the Engineer-in-charge before bulk fabrication and assembly of each unit.

6.2 STORAGE AND HANDLING:

The contractor shall take particular care to stack the fabricated frames etc., on the site under cover. These shall be handled with care and stacked on edge of level bearers and supported evenly.

6.3 Before erecting- the frames coming in contact with concrete, masonry, plaster or dissimilar metals, shall be treated with a coat of zinc chromate. The contractor shall cover the work with transparent lacquer based or methacrylates or cellulose butyrate, tithe surface from wet cement during installation. This coating shall be removed on completion. Before handing over,

the aluminium work shall be washed with mild solution of non-alkali soap and water.

- 6.4 The colour of anodizing shall be uniform mat natural finish otherwise stated and its sample shall be submitted for the Engineer-in-charge, approval before work commences. The section shall be anodized to a minimum thickness of 20 microns. The contractor must submit necessary evidence to the satisfaction of the Engineer-in-charge that the thickness of the anodisation is not less than 20 microns. In case of doubt the Engineer-in-charge may reject the materials.

6.5 TOLERANCE ON SIZE.

Frames should be made to fit the actual openings with not more than 5mm clearance all round. Discrepancies in overall width or height exceeding 5mm will not be allowed and frames will be rejected in such cases. Minor discrepancies acceptable to the Architect/ Employer shall have the gaps suitably filled. The sizes of frames, if noted in the drawings/ schedule of quantities, may vary upto plus or minus 50mm beyond which the rate payable will be increased or decreased proportionate to the changes, where the rate quoted is for one unit number, if the rate quoted is for superficial area, such area will be net finished size of the opening.

7.0 STEEL WORK:

The fabrication, supply and erection of the steel (Fe 500 N/mm²) work consists of accomplishing all related jobs like providing all labour, tools and plant, all materials and consumables such as welding electrodes, bolts and nuts, oxygen and acetylene gases, oils for cleaning etc., All of approved quality, the work shall be executed. In an expeditious and workmen like manner, as contemplated in the drawings and to the complete satisfaction of the project Engineer-cum – Estate Officer, CCMD, representative. The work shall also include providing shop primer coat of paint and grouting of hold down bolts.

8.0 PLASTERING- WORKS:

8.1 EXTENT AND INTENT

The contractor shall furnish all materials, labour, scaffolding, equipment, tools, plant and incidentals necessary as required for the completion of all plaster and wall finishes, subject to approval by the Project Engineer-cum- Estate Officer, CCMD.

8.2 GENERAL

- 8.2.1 Plaster as here in specified shall be applied to all internal and external surfaces where called for Flazed tile dado, terrazzo dado and wall finishes other than plaster shall be provided where indicated on drawings and schedule of finishes. Areas called for on drawings and typical shall be considered to apply to appropriate adjoining area whether shown on same drawings or not whether indicated or not.

- 8.2.2 All plaster works and other wall finishes shall be executed by skilled workmen in a workman like manner and shall be of the best workmanship and in strict accordance with the dimensions on drawings subject to the approval of the project Engineer-Cum-Estate Officer, CCMD.
- 8.2.3 The primary requirement of plaster work shall be to provide absolutely water tight enclosure, dense, smooth, and hard and devoid of any cracks on the interior and / or exterior. The contractor shall do all that is necessary to ensure that this objective is achieved. All plastering shall be finished to the true plane, without any imperfections and shall be square with adjoining work and form proper foundation for finishing materials such as paints etc.,
- 8.2.4 Masonry and concrete surfaces, which call for applications of plaster, shall be clean, free from efflorescence, damp and sufficiently rough and keyed to ensure proper bond, subject to the approval of the Project Engineer-Cum- Estate Officer.
- 8.2.5 Wherever directed by the Project Engineer-cum-Estate Officer, CCMD, or other representative, all joints between concrete frames and masonry infilling shall be expressed by a groove cut in the plaster. The said groove shall coincide with the joints beneath as directed. Where grooves are not called for the joints between concrete members and masonry infilling shall be 24 guage galvanized chicken mesh strip 400mm wide or as called for on drawings/documents which shall be in position before plastering.

8.3 CHASING AND CUTTING:

All chasings, installations of conduits, insert boxes etc., shall be completed before any plastering or other wall finish is commenced on a surface. No chasing or cutting of plaster or other finish on a surface shall be permitted. Broken corners shall be cut back not less than 150mm on both sides and patched with plaster of paris as directed. All corners shall be rounded to a radius of 8mm or as directed by the Project Engineer-Cum-Estate Officer, CCMD.

8.4 SAMPLES:

Samples of each, type of plaster and other wall finish shall be prepared well in advance of undertaking the work for approval by the Project Engineer-Cum-Estate Officer, CCMD.

8.5 PROPORTIONS:

The materials used for plastering shall be proportioned by volume by means of gauge boxes.

8.6 PREPARATIONS OF SURFACES.

The joints in all walls, both existing and freshly built shall be raked to a depth of 15 cleaned with wire brushes, dusted and thoroughly wetted before starting plastering work. Concrete surfaces to receive plaster shall be roughened by hacking over the

entire surface so that the skin of the concrete is completely removed, as approved by the Architect/ Employer to ensure proper key for the plaster.

8.7 PLASTER TO WALLS:

Unless otherwise specified, all works shall be plastered and finished as follows:

Internal faces : 20mm thick with cement mortar 1:6 (one part of cement and six parts of fine river sand) finished smooth with lime rendering.

External faces: 12mm thick base coat with cement Mortar 1:4 (one part of cement and four part of fine river sand) finished rough to receive the final coat and 6mm thick final coat with cement mortar 1:3 (one part of cement and three parts of coarse river sand) sponge finished.

8.8 MORTAR MIXING

Mortar shall be prepared as specified in small quantities as required and applied within fifteen minutes of mixing.

8.9 Plaster application shall be commenced only after the preparatory work is approved by the Project Engineer- Cum- Estate Officer, CCMD. Correct thickness of plaster shall be obtained by laying plaster screeds (gauges) at intervals of 1.5 m as directed. Mortar shall be firmly applied, well pressed, into the joints, rubbed and finished to give a smooth and even surface to the satisfaction of the Project Engineer-Cum-Estate.

8.10 CURING

Finishing Plaster shall be kept wet for at least ten days after completion in hot weather, walls exposed to such shall be screened with matting kept constantly wet or by other approved means.

8.11 CLEANING PLASTERING:

Plaster to ceiling, so fits of stairs flight slabs and similar locations, where called for, shall be 12 mm thick comprising of one part cement and three parts of clean fine sand unless otherwise specified. The surface shall be brushed, swept clean and thoroughly wetted before plastering. Mortar shall be applied firmly pressed to the surface, rubbed and finished smooth evenly subject to the approval of the Project Engineer-Cum-Estate Officer, CCMD.

8.12 CEMENT MORTAR:

8.12.1 Cement mortar shall be of proportion specified for each type of work. It shall be composed of Portland cement and sand. The ingredients shall be accurately gauged and shall be evenly mixed together in a mechanical mixer. Care should be taken not to add more water than necessary. If hand mix is allowed, it shall be done on pucca waterproof platform. The gauged materials shall be put on platform and thoroughly mixed dry. Water shall then be added and the whole

mixed thoroughly until the mix is homogeneous and of uniform colour. Quantity of mortar mixed should not be more than what can be consumed within half an hour of mixing.

8.12.2 Cement mortar mix are specified in 1:2, 1:3, 1:4, 1:5 etc., the first figure will mean one part of Portland cement by volume and the second will mean so many parts of sand by volume. For example cement mortar 1:4 would mean

One part of cement and four parts of sand.

8.12.3 Cement and sand must conform to relevant I.S specification.

8.13 LIME RENDERING:

This will be prepared out of best quality fat lime slaked at site with fresh water not less than one week or not more than two weeks before use. All impurities, ashes and improperly burnt stuff shall be screened and picked out before slaking. Slaked lime shall be screened through to remove all unslaked materials, stones etc., so that only a fine creamy paste is available for rendering. Slaked lime is to be diluted with just sufficient water to give a thick consistent pulp suitable for effective covering of base surface. Before the base coat sets, the lime rendering is applied and finished smooth and the entire plastered surface is made truly plane.

9.0 FLOORING:

9.1 GRANOLITHIC FLOORING

9.1.1 General: The flooring shall be of specified thickness and shall consist of 1:2:4 concrete base or as specified and 12mm thick granolithic wearing coat. The granolithic flooring shall be laid in alternate panels. The size of panels shall be as decided by the Project Engineer-Cum-Estate Officer, CCMD

9.1.2 Laying of 1:2:4 concrete base:

9.1.2.1 The 1:2:4 concrete shall be of graded coarse aggregate of maximum size 10mm, coarse sand and cement. The ingredients shall be thoroughly mixed with sufficient water to obtain the required plasticity.

9.1.2.2 The free water on the surface of the base shall be removed and a coat of cement slurry of the consistency of thick cream shall be brushed on the surface.

9.1.2.3 The prepared 1:2:4 concrete shall be laid immediately after mixing on the fresh grouted base. The concrete shall be spread evenly and leveled carefully. Low places shall be filled, humps removed and the whole surface again leveled. The layer shall be compacted by ramming trowel led and allowed to set.

9.1.2.4 Mixing and laying of wearing coat: one part of cement in dry state shall be mixed with 1.5 parts by volume of well graded/crushed granite chips of

6mm maximum size. The ingredients shall be then mixed with sufficient water so for ordinary concrete. The wearing coat shall be laid 12mm thick over the base concrete immediately after it has set, compacted and leveled with a steel trowel. Just sufficient trowel ling shall be made to give a level surface. The surface should not be over trowelled as excessive trowelling will bring the cement to the surface which shall be strictly avoided. When the initial set takes place, further compaction by steel trowelling shall be done and final brushing shall be made before the topping becomes too hard.

9.1.3 Curing as soon as the surface is hard enough, it shall be covered with sacking or sand and kept continuously wet for a period of at least one week.

9.2 A bed of cement mortar 1:4 shall be laid and properly leveled to average thickness of 20mm and the surface kept slightly rough to form a satisfactory key for the tiles, neat cement paste of honey like consistency shall be spread over mortar bed, over such an area so that the paste will not harden before laying tiles. Slabs shall be soaked in water for 15 minutes and allowed to dry. The slab shall be then fixed as per approved pattern with thin coat of cement paste applied on back of each slab and tapped with a wooden mallet till it is properly bedded in level with adjoining slabs. Joints shall be not more than 1:5 mm wide. The surplus cement grout that may have come out of the joints has to be wiped off gently and joints cleaned. The joints shall, be filled up with grey or white cement with an admixture pigment to match the shade of the slab. The flooring shall be cured for 14 days. Then it shall be polished according to IS: 1443, and pointed with cement mortar: 1:1 (1 part of cement and 1 part of fine screened sand) mixed with matching colour pigment.

9.3 GRANITE SLAB WORK:

9.3.1 General: The slab must be of uniform thickness as specified, the variation in the thickness not exceeding 12 mm and must be from the same source. They shall be of uniform texture and colour free of any veins and streaks. All the edge shall be chiseled true to line, square and shape. The surface should be rough dressed/ one line dressed. Three line dressed pulman dressed/mirror polish as specified.

9.3.2 Rough Dressing: The stone surface to be chisel dressed to one plane by removing all bushings so that the maximum depression is not more than 6 mm.

9.3.3 One Line Dressing: This is done after the rough dressing is completed by point chiseling so that the variations are not more than 4mm. Work includes rough dressing also.

9.3.4 Two Line Dressing: This is done after, one line dressing is done by chiseling so that variations are not more than 2.5mm work includes rough and one line dressing also.

9.3.5 Three Line Dressing: This is done after two lines dressing is over by chiseling so that variations are not more than 1.5mm work includes rough, one line dressing also.

9.3.6 Pulmane Dressing: After the three line-dressing is over, the surface is smoothed by using a special pulmane tool to further even out three line dressed surface so that the maximum variation in surface evenness is not more than 1.0mm work includes rough, one line, two line and three line dressing also unless otherwise stated.

9.3.7 Mirror polishing: The surfaces are to be polished by grinding using manual or mechanical process to give a smooth even perfect plane surface or as may be directed. The polished surface should reflect light like a mirror and must be free from scratches and depressions.

9.4 GLAZED TILING

9.4.1 Glazed tiles shall be from an approved manufacture conforming to IS.777 of specified size, thickness and colour, All specials viz coves, internal and external angels, corners beads etc., shall be used wherever directed. Under layer of 12mm average thickness of cement mortar 1:3 proportion shall be laid tiles shall be well soaked in water washed clean and set in cement grout each tile being gently tapped with wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints should be kept as thin as possible and in straight lines or to suit the required pattern after tiles have been laid surplus cement grout shall be cleaned off the depth of % mm and all dust and loose mortar removed joints shall then be flush pointed with white cement if necessary mixed with pigment to match the colour of the tile. The floor / dado shall be kept wet for 14 days, after curing the surface shall be washed with mild hydrochloric acid and clean water, the finished floor/ dado shall not sound hollow when tapped with wooden mallet, the rate will include the cost of under layer of cement mortar.

10.0 PAINTING

10.1 The specifications covers the various types of all surfaces thought the interior and exterior of the building the number of coats required in various situations and also the type of finish required for the several items of work such as cement based paint, plastic emulsion point, oil bound distemper etc., are specified in the schedule of quantities and specifications.

10.2 Before commencement of the work, the contractor shall provide sample panels of painting at this own cost for the approval of the Project Engineer-Cum-Estate Officer-CCMD, to enable him to keep an accurate check on the materials supplied and final shade to be painted. It is however, the responsibility of the contractor to provide any deviations and defects shall have to be Rectified by the contractor at his own cost.

10.3 Contractor shall protect not only his own work at all times but also all the adjacent work and materials by suitable covering, protection or other methods

acceptable to the Project Engineer-Cum-Estate Officer, CCMD during progress of painting, it is of painting work to remove all paint and varnish spots from floors, walls, glass panes and other surfaces and restore them to original conditions. The work generally touched up shall be attended to after all workmen have left. Accumulated – material, rubbish etc., have to be cleared and the premises left in clean, orderly and acceptable conditions.

- 10.4 Contractor shall provide scaffolding wherever necessary erected on double supports tied together by horizontals. No ballies, bamboos or planks shall rest on or touch the surface, which is being painted. Contractor is demand to have considered the following while tendering and no extra claim on account of these will be entertained.
- 10.4.1 Supplying the paint and other materials required of approved colour and brand.
- 10.4.2 Preparing the surfaces to be painted.
- 10.4.3 Providing and erecting scaffolding and removing the same after completion of the
- 10.4.4 Lifting of materials to any height and painting at all levels.
- 10.4.5 Applications of painting as per the specification and to manufactures instruction.
- 10.4.6 Curing, protecting the painted surfaces and adjacent work and thoroughly cleaning of premises.
- 10.5 The paint shall generally conform to the chemical composition and other characteristics laid down in the relevant Indian standard specification. The entire materials required for painting work shall be obtained direct from approved manufactures or their authorized agents and brought to site in original manufactures containers with seals unbroken.
- 10.6 Paint shall be ready mixed of quality of the approved brand and manufacture. Mixing of paint by the contractor at site will not be allowed, except preparation and their quality shall be strictly maintained as per manufacture's instruction and all as directed by the Project Engineer-cum-Estate Officer, CCMD. All the materials shall be kept properly protected when not actually in use. Lids of containers shall be kept closed. Materials which have become stale or flat (in opinion of the project Engineer-Cum-Estate Officer, CCMD) shall not be permitted to be used on the works and shall be removed from site forthwith. Any materials found not conforming to the relevant specifications shall have to be removed by the contractor from the site at his own expenses.
- 10.7 Providing two coats of synthetic enamel paint of approved make colour over one coat of primer on plastered surfaces, wooden surfaces and steel surfaces: A fully putty coating has to be given after primer coat in the case of wooden

surfaces. The putty shall be made from pure whiting mixed to the proper consistency with new linseed oil, a little white lead being mixed to help hardening of putty. On no account putty is to be used before primary coat. Primers to be used shall be according to the manufacture specifications.

10.8 The manner of taking measurements will be in accordance with ISI: 1200.

11.0 WHITE WASHING

White wash shall be prepared from fat lime or shell lime slaked on site mixed with just enough water to make a thick paste and allowed to remain for atleast 7 days before use. At the time of using the paste shall be diluted with just sufficient water and strained through cloth. 4 kg of gun dissolved in hot water shall be added to each cubic meter of cream (115 GMS per cft). Ultra marine blue or other approved locally available colour pigment shall be added to give required whiteness. The number of coats as specified in the bill of quantities shall be added to give required whiteness. The number of coats as specified in the bill of quantities shall be applied by using flat brushes or spray pimps, on surface prepared. Each coat shall be allowed to dry before next coat is applied.

12 TREATMENT FOR SUNKEN FLOOR SLAB:

- A. Brick bat aggregate shall be from well burnt bricks. The proprietary water proofing compound and the quantity to be used shall be as per para 15.1
- B. The surface shall be thoroughly cleaned with wire brushes. All loose scales shall be removed and dusted off. The surface (bottom as well as sides) shall be treated with cement slurry admixed with proprietary water proofing compound to penetrate interstices and fill the pores in the surface.
- C. After the slurry coat is laid, a layer of well burnt brick bats/ aggregates of about 40mm size shall be laid in cement mortar of mix as specified by the specialist firm but not leaner than 1:5 (a cement : 5 coarse sand) admixed with proprietary water proofing compound the mortar being filled to half the depth of the aggregate. The brick bat/aggregate layer shall be rounded off at junctions with the beam all etc., and tapered towards top to a height of 100mm long beams/ wall, etc., curing of this layer shall be done for 3 days.
- D. After curing the surface shall be applied with a coat of cement slurry admixed with proprietary water proofing compound.
- E. Joints of brick bat/ aggregate shall be filled fully with cement mortar of mix as specified by the specialist firm but not leaner than 1:4 (1 cement. 4 coarse sand) admixed with proprietary water proofing compound and top finished with average 20mm thick layer of some water. This layer of mortar shall be continued to the sides of beam. Wall etc., the height upto which this treatment is to be extended on the sides shall be as directed by the Engineer-in-charge.

The surface shall be finished smooth with cement slurry admixed with proprietary water proofing compound.

- F. While the water proofing treatment is 3qrie it shall be ensured that the outlet pipes are properly fixed arid the gap between the wall and pipes are properly filled with brick/stone aggregate and cement mortar admixed with proprietary water proofing compound and grouted with cement slurry admixed with proprietary water proofing compound by injection process.
- G. Water proofing treatment shall be cured for 10 days
- H. Measurements: measurements for the floor treatment shall be taken on plain area of floor treated nothing extra shall be paid for rounding off at junctions and taking the treatment along sides of beams and walls for about 100mm sides of beam/wall etc., where the treatment is only with mortar shall be measured and paid separately , length and breadth shall be measured correct to once centimeter and area calculated correct to 0.01 sqm
- I. Rates: The rates shall include the cost of all labour and material involved in all the operations described above. Base treatment and sides treatment will be paid separately under respective items.

PART II: SPECIFICATIONS FOR WATER SUPPLY AND SANITARY WORKS

1.0 GENERAL

1.0 SCOPE OF WORK:

The general character and the scope of work to be carried out is illustrated in the drawings and specifications. The contractor shall carry out and complete the said work under this contract in every respect in conformity with the rules and regulations of the local authority. The contractor shall furnish all labour, supply and install all materials, appliances, tools, equipments etc., necessary for the complete provision and testing of the whole plumbing services installation as specified here as per the relevant ISI codes as shown on the drawings. This also includes any material, appliances, equipment not specifically mentioned herein or noted on the drawings as being furnished or installed but which are necessary and customary to make a complete installation as shown on the drawings or described herein, properly connected and in working order.

In general, the work to be performed under this contract shall comprise of the following:

- 1.1 All incidental jobs connected with water supply services installation, such as excavation in trenches and back filling, cutting chases in concrete, brick etc., and making good cutting drilling holes through walls, floors and grouting for embedding of fixtures, equipment and fixing of valves, pumps etc.,
- 1.2 Furnish and install a complete workable, service installation as shown on the drawings and as per the latest ISI specifications including all that which is reasonably inferred.
- 1.3 Complete installation of internal water supply system.
- 1.4 Complete installation of the sewerage and sewerage appurtenances internally and around the building.
- 1.5 Complete installation of all sanitary and plumbing fixtures.
- 1.6 Co-operation with other crafts in putting the installation in places. Any work without regard or consultation with other trades, shall be removed by the contractor without any traditional cost to the employer, to permit the proper installation of all other work, as prescribed by the architects.
- 1.7 Repair all damages done to the premises as a result of this installation and remove all debris arising there from to the satisfaction of Project- Engineer – cum- Estate Officer.

- 1.8 Cleaning of all plumbing “fixtures, testing and showing satisfactory performance all the fixtures at the time of handing over to the Project Engineer-cum-Estate Officer.
- 1.9 It is the responsibility of the contractor to safe guard and takes care of all the fixtures fitted until the time handing over to the Project Engineer-cum-Estate Officer.
- 1.10 Painting of all concealed and exposed pipes as specified.
- 1.11 Assume full responsibility of all statutory requirements.
- 1.12 At the completion of the work, furnish necessary information like invert levels and layout of pipeline etc., and prepare final completion drawings to the Project-Engineer-cum-Estate Officer.

2.0 REGULATIONS AND STANDARDS:

2.1 The installations shall conform in all respects to the following board list of standards in general:

- | | | |
|----------------|---|---|
| IS 3114 – 1965 | : | Code of practice for laying of CI pipes. |
| IS 1230-1968 | : | Specifications for mild steel tube, tubular and other steel |
| | | pipe fittings part I |
| IS 1536 – 1980 | : | Centrifugally cast (spun) cast iron pressure pipes for water, gas and sewerage. |
| IS 780 – 1980 | : | Sluice valve for water works purposes. |
| IS 1520 – 1980 | : | Horizontal centrifugal – pumps. |

2.2.1 The installation shall also be in conformity with the byelaws and requirement of the local authority in so far as these become applicable to the installation wherever this “specification calls for a higher standard of materials and / or workmanship than those required by any of the above regulations and standards then this specification shall take precedence over the said regulations and standards. Wherever the specification require something which will violate the regulations, the regulations shall govern.

3.0 PERMITS AND TESTS:

On completion of the work, the Contractor shall obtain and deliver to the Project Engineer-cum-Estate Officer, CCMD certificates of final inspection and approval by the local authority as may be applicable. The Project Engineer-cum-Estate Officer, CCMD shall have full power to require the materials or work to be tested by any independent agency at the contractors expenses in order to prove their soundness and adequacy.

4.0 DRAWINGS AND SPECIFICATION

The drawings and specification shall be considered as part of this and any work or materials shown on the drawings and not called for in the specifications or vice versa shall be executed as if specifically called for in both. The contract drawings shall indicate the extent of general, arrangement of the fixtures, drainage system etc., and essentially diagrammatic. The drawings indicate the points of supply and termination of pipe runs and broadly suggest the routes to be followed. The work shall be installed as indicated on the drawings, however, any changes found essential to coordinate, this work with other trades shall be made without any additional cost. The data given herein and on the drawings is as exact as could be secured but its complete accuracy is not guaranteed. The drawings and specifications are of the assistance and guidance to the contractor and exact location distance and levels will be governed by the individual building and site condition, therefore approval of the Project Engineer-cum – Estate Officer, CCMD on tracing cloth.

5.0 MANUFACTURERS INSTRUCTIONS:

Where manufacturers have furnished specific instructions, relating to the materials used in this job, covering points not specifically mentioned in job, covering points not specifically mentioned in these documents. These instructions shall be followed in all cases.

6.0 CHANGE IN DIMENSION

If the size of the fixture mentioned is not available, then the nearest available size shall be fixed with due consent of the Engineer-in-chief, CCMD.

7.0 MATERIALS:

- 7.1 Materials shall be of the best quality obtainable and unless otherwise specified they shall conform to the respective Indian Standards Specification.
- 7.2 Samples of all materials shall be as per the list of approved branch manufacture. The samples shall be got approved before placing order and the approved samples shall be deposited with the Engineer-in-chief, CCMD.
- 7.3 In case of non availability of materials in merits, sizes, the nearest size of EPS units shall be provided with prior approval of the Engineer-in-chief Project Engineer-Cum-Estate Officer, CCMD, for which no extra will be paid.

8.0 TRENCHES FOR PIPE DRAINS:

- 8.1 Opening out trenches: In excavating the trenches etc., the road metalling pavement curbing etc., are to be placed on one side and preserved for reinstatement when the trench or other excavation shall be filled up at no extra cost.

Before any road metal is replaced, it shall be carefully shifted, the surface of all trenches and holes shall be restored and maintained to the satisfaction of the Architects. The contractor shall not-cut or break down any live fence of trees in the one of proposed works but shall tunnel under them unless the Architects shall order to the contrary. The contractor shall scrub up and clear the surface over the trenches and other excavations of all stumps, roots and all other encumbrances affecting execution of the work and shall remove them from site to the approval of the Project Engineer-Cum-Estate, Officer, CCMD.

- 8.2 Cutting of roads: All works across the roads, shall be carried out as per the directions of the Project Engineer-Cum Estate Officer, CCMD.
- 8.3 Excavation to be taken to proper depth: The trenches shall be excavated in all conditions of soil and to such a depth that the pipelines shall rest as described in the several clauses relating there to and so that the inverts may be at the levels given the drawings. In loose soil, the Project Engineer-cum-Estate Officer, CCMD. May order the contractor to excavate to a great depth than shown on the drawings to fill up the extra excavation with concrete, sand, gravel or other materials. For such authorized filling of materials the contractor shall be paid extra at the rates laid down under clause 20.0 of the general conditions of contract, if the extra work was ordered by the Project Engineer-Cum-Estate Officer, CCMD. If the contractor should excavate the trench to a greater depth than is required without a specific order to that effect in writing, the extra depth shall have to be filled up with concrete at the contractor's own cost to the requirements and satisfaction of the Project Engineer-Cum- Estate Officer, CCMD.
- 8.4 Refilling: After the pipes or other fittings has been laid and proved to be water tight, the trench or other excavation shall be refilled. Utmost care shall be taken in doing this, so that no damage shall be caused to the pipes and other permanent works. Filling in the trenches and upto 50cm above the pipes shall consist of the finest selected materials placed carefully and consolidated. After this has been laid, the trench and other excavation shall be refilled carefully in 15cm layers with materials taken from the excavation each layer being watered and consolidated.
- 8.5 Settlement and Damages : The contractor shall, at his own cost make good promptly, during the whole period the works are in hand, any settlement that may occur in the surfaces of roads, beams, footpaths, gardens, open spaces, etc., whether public or private caused by his trenches or by his other excavations and he shall be liable for any accidents caused thereby. He also shall at his own expenses and charge, repair and make good any damage to the buildings and other properties.
- 8.6 Disposal of surplus soil: The contractor shall at his own cost and charge, dispose within the site all surplus excavated material not required to be used on the works to within a distance of 50cm.
- 8.7 Timbering of pipe line and trenches: The contractor shall at all times support efficiently and effectively the sides of the pipe trenches and other excavations by suitable timbering, piling, sheering etc., without any extra cost. All timbering, sheeting and piling with their wallings and supports shall be of adequate dimensions and strength and fully braced and strutted so that there is no risk of collapse or subsidence of the walls of the trench. The contractor shall be held accountable and responsible for the sufficiency of all timbering, bracing, sheeting and piling used and for all damages to persons and property

resulting from the improper quality, strength, placing, maintenance or removing of the same.

- 8.8 Removal of water from pipeline, trenches etc., : The contractor shall at all times during the progress of work keep the trenches and excavations free from water which shall be disposed of by him in a manner as will neither cause injury to the public health nor to the work completed or in progress nor to the surface of any roads or streets nor cause any interference with the use of the same.
- 8.9 The width of the excavated trench shall be as per the table given below width at bottom

Excavation upto 90cms depth	33cm	33cm
90 to 150cm depth	60cm	60cm
150 to 300cm depth	75cm	75cm
300 to 500cm depth	90cm	100cm

- 8.10 Protection of existing services : All pipes, water mains, cables etc., met in the course of excavation shall be carefully protected and supported.

- 8.11 Concreting: All pipes at shallow road crossings and made up ground shall be laid on a bed of 15cm concrete with one part of cement, 4 parts of sand and 8 parts of 40mm gauge stone metal property consolidated. Concrete shall be laid to the full width of the trench and also in haunches.

8.12 CAST IRON PIPES AND FITTINGS

- 8.12.1 Cast – iron soil, waste and vent pipes and fittings shall be of heavy quality conforming to IS 1536-1967 and fittings to IS 1537-1960

- 8.12.2 Claying and Jointing: The pipes shall be laid, underground, under the floors, or on walls either buried or exposed as the case may be as shown on the drawings.

- 8.12.3 Cast Iron, Pipes: Cast iron pipes shall be laid and jointed in conformity with the code of practice for laying of cast iron pipes. Cast iron pipes shall be jointed by best quality caulking lead free from all impurities in wet trenches, joints shall be made with lead wool. The spigot shall be centered in the adjoining socket by tightly caulking in sufficient turns of tarred gaskin to leave unfilled the required depth of socket for lead. Where the gaskin has been caulking tightly home, a jointing ring shall be placed round and barrel and against the face of the socket. Molten lead shall then be poured into fill the remainder of the socket in one with suitable tools by hammering right-round the joint, to make up for the shrinkage of the molten metal on cooling and shall preferably finish 3mm behind the socket face. Lead for caulking shall conform to IS 782-1966. The quantity of lead to be filled per joint in various sizes of cast iron pipes. Shall be as follows:

Water main pipes: Lead /joint (Kg)

80mm (3") pipe	1.8
100mm (4") pipe	2.2
125mm (5") pipe	2.6
150mm (6") pipe	3.4
200mm (8") pipe	5.0

8.12.4 The joints and pipes laid for water supply systems shall be tested to a pressure of 12kg.sqcm for two hours without developing leaks/fall in pressure. The drainage pipelines and joints shall be tested to a head of 150cm for two hours without developing leaks/fall in pressure. In case of leaks the piping shall be redone in such portion and the test repeated till achieving satisfactory results.

8.12.5 Under ground piping shall be of CI tyton type confirming to IS class A 1536 the piping shall be laid not less than 1Mt below the ground level. Suitable masonry/ PCC support anchor blocks shall be provided at change in direction with soil conditions are unsatisfactory.

8.12.6 All fittings shall be CI flanged confirming to IS 1538. The flanges shall be drilled as per relevant Indian Standards Flanges shall be faced and cleaned and shall have jointing of rubber insertion or asbestos compound. In case of tyton pipes the joint shall be made by using rubber gaskets as per manufactures specification. The joint shall be capable of withstanding a pressure of 10.5 Kg/Sqcm.

9.0 SLUICE VALVES

Sluice valves shall conform to IS: 780 valves shall be of right hand type. Only flanged valves shall be used . Valve wheel shall have an arrow engraved or cast thereon showing the direction of turning open or close operation.

10.0 NON-RETURN VALVES

Non return valve shall be of cast iron with gun metal seat. Non return of valves shall be of flanged type. Spring loaded valves shall not be used. The valves shall be suitable for a test pressure of 21 kgs/Sqcm.

11.0 MODE OF MEASUREMENT

- 11.1 Excavation (General): the width of excavation shall be limited to as said earlier.
- 11.2 Cast iron pipes: Cast iron pipes shall be measured along the center line of the pipe including all specials in Rmt. The quoted rate for respective item shall be Rmt, and shall include the following:
- A. Cost of respective pipes and specials and jointing materials etc.,
 - B. Laying fixing and jointing with necessary clamps, brackets, bolts, nuts and washers.
 - C. Making good all damages to the parts of the building to suit the surroundings and making good the defects if any.
 - D. Testing and making good the defects if any

Valves: Valves shall be per number only and shall include the following:

- A. Cost of valve and jointing materials
- B. Fixing and jointing with necessary bolts, nuts, rubber insertion etc.,
- C. Testing and making good the defects if any:

11.4 GI Pipes and Fittings:

The pipes shall be of the medium quality (class B) unless otherwise specified and shall be of galvanized iron, screwed socketed and shall conform to IS: 1239. They shall be manufactured by a firm of repute. All fittings shall be malleable iron galvanized fittings of approved best Indian make.

11.4.1 LAYING AND FIXING

11.4.1 Where pipes have to be cut or re-threaded, ends shall be carefully out so that no obstruction to bore is offered. For internal work all pipes and fittings shall be fixed truly vertical and horizontal either by means of standard pattern holder bat clamps keeping the pipes (12mm) clear of the wall everywhere or concealed as re-directed.

11.4.1.2 For external work, G.I pipes and fittings shall be laid in trenches. The width of the trench shall be the minimum width required for working. The pipes laid underground shall not be less than 60cms. From the finished ground level. The work of excavation and refilling shall be done as specified elsewhere or concealed as directed.

11.4.2 Painting : The burred pipes shall be painted with two coats of bit mastic paint.

11.4.3 Testing: Before any pieces are painted or covered, they shall be tested to a hydrostatic pressure of 7 kg/sqcm pressure shall be maintained for atleast eight hours without appreciate drop in pressure, in addition to the sectional testing of water supply pipes, the contractor shall test the whole installation to the entire satisfaction of the Project Engineer-Cum – Estate Officer, CCMD. He shall rectify any leakages, failure of fittings or valves.

11.4.4 Mode of measurements: G.I pipes above and below ground shall be measured along the center line of the pipes and fittings the quoted rate for respective item shall be per Rmt and shall include the following:

- a) Cost of respective pipes and specials
- b) Laying, fixing and jointing with necessary clamps
- c) Cutting hole and chases in walls floors, etc., and making good the same
- d) Testing and making good the defects if any.

PART III: SPECIFICATIONS FOR ELECTRICAL INSTALLATION

1.0 LEGEND:

- 1.1 Internal electrification (general lighting and power) is for general lighting for fans, lugs, lights etc.

2.0 GENERAL

- 2.1 The electrical installation shall comply in all respects with the requirements of the Indian electricity act, 1916 as amended from time to time and the Indian Electricity rules and Regulations currently in force.
- 2.2 Materials, fittings and appliances shall be of the best quality and of approved make/ manufacture; conforming to the relevant Indian Standard Specifications. Samples must be attached to Project Engineer-Cum-Estate Officer, CCMD for their approval well in advance, atleast prior to execution of work, (tenderers tenders may specify the name of makers/manufactures of the materials, fittings and appliances which they propose to use, while tendering)
- 2.3 Workmanship shall be I Class, conforming to the requirements of the I.E Rules and regulations currently in force. 2.4 it shall be the contractors responsibility to prepare the necessary drawings/ chart, and submit the same through proper channel to the concerned authorities for approval of the installations:

3.0 GENERAL LIGHTING:

- 3.1 The wiring is to be done in concealed conduit for full unless otherwise specified. The distribution of circuit distribution boards and main board are as indicated in the layout.
- 3.2 The circuit distribution boards are all to be completely embedded in walls to make them flush to the surface.
- 3.3 The main control board to be fixed in position as indicated in the layout and in the manner indicated by the Project Engineer-Cum-Estate Officer, CCMD, the power supply is so be drawn from the existing overhead line through an underground cable system, using necessary size G.I pipe at the wall entry. The cable jointing work should be done by an experience person specially trained for such jobs. The scope of this work includes laying cables in trenches (the trenches to be prepared by the contractor himself) and the cable jointing using necessary compounds.
- 3.4 The scope of this work covers the supply and installation of fittings like lighting fixtures, ceiling fans, exhaust fans, complete in all respects like mounting accessories lamps, wiring etc.,

- 3.5 The wiring for lights, plugs, fans etc., shall be of “looping-in-system” and in each and every switch box a neutral point shall be made available for testing purpose.
- 3.6 Not more than two power socket outlets should be connected in the same circuit and the power plugs be wired with PVC insulated conductor wires drawn in conduit.

4.0 POWER:

- 4.1 Power wiring in conduits shall unless otherwise specified, also be of concealed type run on walls independent of general lighting wiring based on the principle of overhead bus bar systems.
- 4.2 The mains will be terminated and connected through immediate junction boxes as shown in the layout and type of termination shall be as detailed in the layout: The tapping connections to load circuit boards shall be from the individual intermediate junction boxes, which will be at suitable capacity fuse units. The neutral connection shall be direct without fuse.
- 4.3 The tapping connections to load circuit boards shall be from the individual intermediate junction boxes, which will be at suitable capacity fuse units. The neutral connection shall be direct without fuse.
- 4.4 The control boards for the load outlets shall be fixed at a height of not more than 5 ft from the floor level and shall be in such a position as will be indicated by the Project Engineer-cum-Estate Officer at the time of execution.
- 4.5 All the intermediate junction boxes and the load control boards shall be suitable for flush mounting on the walls.
- 4.6 A portion of the power main pipes shall be possible to run the same on walls.

5.0 EARTHING:

- 5.1 Earthing in the case of power wiring shall be with soft drawn bars copper wire of size not less than 10 SWG, in double run suitably fixed on to the surface of the conduit by means of copper earth clips to ensure perfect electrical contact and the earthing wire shall run throughout the length of the conduit. At the main board level of individual earth wire runs shall be suitably interconnected firmly by means of earth clips to ensure proper continuity of earth connections, as well as full electrical contacts with the conduit pipes of the intermediate junction box and the load control boards and any other metal works in the wiring system shall all be suitably connected for perfect earth connections with insulated copper wire of size not less than 22G interconnections to the main earth loads. All the above works shall be in conformity with IS 732-1963

Code of practice for electrical wiring installation (system voltage not exceeding 650v)

6.0 GENERAL LIGHTING:

- 6.1 Insulated copper wire of not less than 22 G shall be used for the running of continues earth wire all along with conduits and shall be firmly bounded by means of suitable size earth clips, externally in order to have good electrical contact Bare copper wire sizes not less than 4 SWG shall be used for the main earthing connections.
- 6.2 These two earthing point outside the building shall be according to the I.S specifications for pipe earthing (IS 732-1963) provision shall be made at the light and fan outlets for earthing connections, so that they can be used wherever found necessary instruction from the Project Engineer-Cum-Estate Officer, CCMD.

7.0 Materials:

- 7.1 The conduit pipes to be used shall be heavy guage not less than 2mm thick of PVC conduit and good quality. The minimum size of conduit to be used shall be $\frac{3}{4}$ " dia. The conduit fittings like bends, junction boxes etc., should be of standard quality and shall be with good deep matching threads to suit the conduit pipes and shall be free from burs etc.,
- 7.2 The switch boxes etc., shall be metal clad out of M.S Sheets not less than 16SWG either square or oblong in shape and in suitable sizes as per requirements and shall be provided with earthing terminal screws for body earthing connections. The depth of the boxes shall be such that they should fully be embedded in the wall, flush with the finished wall surfaces.
- 7.3 The top covers of these boxes be of either laminated sheets of thickness between 1/8" to 1/4" as required for perspex sheets.
- 7.4 The control switches for lights shall be hush type as specified 7.5 the 5 amps plugs and socket shall be 3 pin flush type
- 7.5 The 15 amps 3 pin power plugs shall be preferably flush mounting type with a combined switch and shall be controlled by a fuse or a miniature circuit breaker single pole type.

8.OPARTICULAR SPECIFICATIONS:

- 8.1 Type/system of wiring : only loop in system of wiring with PVC in conduit (surface as per details in schedule) and junction boxes where absolutely necessary and only at the places approved by the Engineer-in-Chief, CCMD.
- 8.2 Wires: Single core multistrand copper PVC of approved make and conforming to ISI only should be used.

- 8.3 Conduit: Heavy gauge of 2mm thick PVC conduit pipe. Conduit drops must be laid to plumb. PVC bushings should be provided at all ends of conduits.
- 8.4 Workmen: All work must be executed by licensed electrical wiremen possessing valid licences.
- 8.5 Switches: All 5 amps switches and 3 pin wall plugs must be of good quality or equivalent approved make.
- 8.6 Florescent Fittings: Light fittings should be complete in all respects including clamps reflectors, tubes, chokes, condensers, starters and internal wiring, extras on this account not admissible. The rate quoted must include these elements as well. Any damage to these fittings during erection/ installation should either be made good or fitting replaced totally.
- 8.7 Cables: Cables shall be with aluminium conductor, PVC insulated conforming to IS specification.
- 8.8 The contractor should enclose the pamphlets, catalogues of various materials offered while submitting the tender. The tenderers are required to submit along with their tender the list of makes of all equipments, fittings, fans, lamps, switches, gear, fuse gear, conduits and accessories, wiring materials and accessories. Non compliance to this will subject to their tender for disqualification or rejection.
- 8.9 Earthing: All machine parts, metal covers, switches, panels, fittings should be I/P earthed as given in the schedule and this has to be approved by the electrical inspector. The procedure should be strictly from L.E.E Regulations and Indian Electricity Act. Earthing in continuity for conduit pipes throughout and at junction boxes should be maintained by check nuts on either side and earthing clamps where necessary.
- 8.10 Boards: The main board and the sub distribution boards should be metal clad. The M.S sheet used for the box should be 3 mm thick and holes of the required diameter for incoming and outgoing pipes should be drilled in it.
- 8.11 Wiring diagrams: The contractor shall, on completion of electrical works executed in the budding furnish in duplicate the wiring diagrams indicating the light, power, fan points/outlets etc., indicating the colour code also so as to enable easy identification of circuits.

I.S SPECIFICATIONS

A general list of IS Specifications applicable to this contract is appended here with

IS CODE NO

SP 7-1970	National Building Code
1885	Symbols
4648	Guide for electrical layouts
5578	Marketing of insulated conductors
5216	Guide for safety in installations
374	Ceiling fans
5077	Decorative light fitting
1913	Safety requirement of fittings
1536 & 6616	Ballasts
3323	Bi-pin lamp holders
2215	Starters for fittings
2418	Flourescent lamps
1569	Discharge lamps
3324	Holders
5513	Boxes for enclosures for Ele Accessories
Sp-7-2675	Fuse distribution boards
371	Ceiling roses
2667 & 3387	Metal conduits – fittings and accessories
1653	Rigid metal conduits
3854	Switches for lighting circuit control
1293	Three pin plugs
2351	Danger Board
3106	Instalation and selection of fuses
3043	Earthing
2147	Degree of protection by switch and control gear
4237	Requirement for switch and control gear
40437	Heavy duty air break switch and Sf units
2208	HRG fuses
375	Switch gear bus bars
2607	Air break isolators
1951	PVC sleeveings
1255	Code of practice for laying cables.
1694	PVC insulated cables.
1554	PVC cables.
3961	Current rating of cables.

LIST OF APPROVED MAKES FOR CIVIL WORKS

	Item	Make
1	WINDOWS	
2	ALUMINIUM	JINDAL/INDAL/HINDAL CO
3	STEEL	TATA/SAIL
4	DOORS	SAL WOOD DOOR WITH FLUSH SHUTTER, GRP LAMINATED DOORS
5	GLAZING	JOHNSON, KAJARIA
6	GLAZED TILES	JOHNSON, KAJARIA, NAVEEN
7	CERAMIC TILES	JOHNSON, KAJARIA, NAVEEN
8	PAINTS AND DISTEMPER	ASIAN BRAND, APEX BRAND
9	SYNTHETIC ENAMEL	ASIAN BRAND
10	WATER PROOFING COMPOUND	FOSROC, DR.FIXIT
11	VITRIFIED FLOORING	JOHNSON, KAJARIA
IF THE ABOVE BRAND IS NOT AVAILABLE THE EQUIVALENT MATERIAL TO BE APPROVED BY THE ENGINEER-IN-CHARGE BEFORE FIXING		
ALL MATERIAL SHALL HAVE TO BE GOT APPROVED FROM THE ENGINEER-IN- CHARGE BEFORE BEING USED.		

<u>List of approved makes – Plumbing and sanitary Works</u>		
1	VITREOUS CHINA SANITARY WARE	HINDUSTAN SANITARY WARE/ PARRY WARE
2	C.P FITTINGS	JAQUAR CONTINENTAL
3	PVC PIPES (SWR QUALITY)	ORIPLAST
4	G.I FITTINGS	R BRAND
5	G.I PIPES	TATA B CLASS A GRADE
6	BALL VALVE (15MM TO 150MM DIA)	ZOLOTO/AM
7	GUN METAL GATE VALVE	ZOLOTO/LEADER
8	STONE WARE PIPES AND GULLY	NECO/TSL/ANDHRA
9	MAN HOLE COVERS	NECO
10	EWV SEAT COVER TO LID	COMMANDER/PRINCE
11	FLOAT GLASS MERCURY COATED	MODI/KONICA
12	PVC CONNECTION PIPE	KOHINOOR
13	PVC SWR PIPE	SUPREME
14	FLUSHING CISTERN	SLIMLINE
15	CP BOTTLE TRAP	JAQUAR
16	MIRROR	ATUL/MODIGUARD
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		

List of approved makes – Electrical works		
A	PVC CONDUITS	UNIVERSAL/UNI PLAST
B	UG CABLES	UNIVESAL /CCI/ANCHOR/GLOSER/FINO LEX
C	COPPER WIRES	WINCAP/FINOLEX/ANCHOR
D	DP SWITCHES, SP SWITCHES AND SOCKETS	ANCHOR/ROMA
E	MCB/ELCB	MDS/L&T HAGER
F	SWITCH FUSE UNITS/FISE LINK	GEC/EE/L&T/SCHNIEDER
G	FLOURESENT /CFL TUBE FITTING	PHILIPS/CROMPTON
H	LAMPS	PHILIPS/CROMPTON
I	EXHUST FANS	GEC/CROMPTON
J	TELEPHONE CABLES	DOORAVANI/DELTON
K	MAIN MCB-DB (MDB)	L&T HAGER/ABB/SCHNIEDER
L	DB-KIOSK	L&T HAGER/MDR/ABB/SCHNIEDER
M	CT	L&T HAGER/ABB/SCHNIEDER
N	VOLT METER – ANALOGUE METER	L&T HAGER/ABB/SCHNIEDER
O	AMMETER-ANALOGUE METER	L&T HAGER/ABB/SCHNIEDER
P	INDICATING LAMPS	L&T HAGER
Q	GRIMMING LUNGS	DOWELS MAKE ONLY
R	CEILING FAN	CROMPTON GREAVES
S	GEYSER	RACOLD/BAJAJ
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		

List of approved makes – Electrical works

S1	DESCRIPTION	MAKE
1	GI PIPES	TATA/JINDAL
2	PUMPS	KIRLOSKAR
3	PRESURE GAUGE	H GURU
4	PRESSURE SWITCH	INDFOSS
5	MOTOR CONTROL PANEL	MICRO POWER SYSTEM/ SUBRAMANYAM INDUSTRY
6	CABLES	TOSHIBA/HAVELLS/UNIVERSAL
7	BUTTERFLY VALVE	INTERVALVE/ADVANCE
8	NON RETURN VALVE	INTERVALVE/ADVANCE
9	Y-STRAINER	ANIL/LEADER/SAMSUNG
10	HYDRANT VALVE	ISI MARKED
11	HOSE BOX	GURAD FIRE/ SUBRAMANYA INDUSTRIES
12	CP HOSE	ISI MARKED
13	BRANCH PIPE	ISI MARKED
14	BALL VALVE	ITAP/R BRAND
15	FIRE HOSE REEL DRUM	OMEX
16	FIRE EXTINGUISHERS	ISI MARKED
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		