

TENDER NO.

**TENDER FOR PROPOSED  
SATPUR BRANCH BUILDING  
BANK OF MAHARASHTRA**

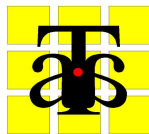
( CONSTRUCTION PERIOD – 3.0 MONTHS ) Tender submission – 7th Feb 2015 ,  
12.00Noon  
At Zonal office , BOM, Nashik  
Tender opening 7th Feb 2015 , 03.00PM

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Site address – Plot No 44/13 , Satpur Industrial area , Nashik

ISSUED TO :- \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**CONSULTANT**



**TARE AND ASSOCIATES**

14 , FIRST FLOOR , ABOVE HOTEL PATHIK

SHALIMAR, NASHIK

**EMPLOYER**

**BANK OF MAHARASHTRA**

Bidder to submit this document on his letter head)

Date :

TENDERER: \_\_\_\_\_  
\_\_\_\_\_

To,  
AGM  
BANK OF MAHARASHTRA  
NASHIK

Works : Construction of SATPUR BRANCH -BANK OF MAHARASHTRA  
Location : **Plot No 44/13 , Satpur Industrial area , Nashik**

We, the undersigned bidder submit this offer and undertake to perform, provide, execute and do all the works, materials, matters and things described or mentioned in the enquiry, special conditions, general conditions, bill of quantities, drawings and specifications which have been issued and carefully examined by me/us in strict accordance with and under the same subject to the terms, provisions and condition set forth or mentioned in the said documents at the estimated price of Rs. \_\_\_\_\_(Rupees \_\_\_\_\_ only) PER SQ.MTR .

We also undertake to do all extra or varied works which may be ordered as part of this contract upon the terms provided for in the conditions of contract.

We undertake to complete the whole of the works required in accordance with the program from the date of receipt by me/us of notice that my/our tender has been accepted.

I/We hereby undertake and agree to abide by this offer for Forty five (45) days from the date set for receipt of this offer or any extended date as may be mutually agreed upon.

I/We hereby submit a Demand Draft/Banker's Cheque No \_\_\_\_\_ drawn on \_\_\_\_\_ bank \_\_\_\_\_ branch for **Rs. (Rupees ..... only ) in favour of AGM -BANK OF MAHARASHTRA payable at Nasik (interest free) towards Earnest Money Deposit** for due execution of the works at my/our quoted rates.

I/We further agree to complete the works included in the scope within the prescribed time schedule subject to agreed liquidated damages as mentioned thereto

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Signature and stamp of the Contractor

**SCOPE OF WORK & SPECIAL TERMS –“ C” FORM TENDER**  
**Supersite to all condition**

Sr.no.	Item	Particular	Remark
1	Type of Tender	It is “ C” form tender , payment will be on construction area basis.	
2	Tender submission	<b>7th Feb 2015 , 12.00 Noon at</b> Zonal office BANK OF MAHARASHTRA, OLD AGRA ROAD GRIHANIRMAN BHAVAN ,GADKARI CHOWK NASHIK	Tender will open at the same day at 3.00 pm if possible .
3	Tender fees	Rs. 4000/- <b>For RTGS</b> Name – Tare And Associates Bank name - Union Bank of India , Branch Name- Nasik city branch. Current A/c No. 323801010030051 IFSC ( code 11 digit) - UBINO532380 MICR ( code 9 digit) - 422026002  Note - After deposition of this amount , all payment details ,UTR number along with request letter is to be email on <a href="mailto:mmtare@yahoo.com">mmtare@yahoo.com</a> . <b>After receiving the email , the details drawing will be send by email to concern bidder.</b>  If within 3 working days , email not receive from Tare and associates , then bidder has to collect the drawing on his own pen drive from the office of Tare and associates.	Without this ,  price bid will not be consider.
4	EMD	Rs. 1,00,000/- by DD in favour of “ DGM , Bank of Maharashtra , payable at Nasik.	Without this ,price bid will not be consider
5	Work completion period including monsoon	3.0 calenderer months ( 90days including all holidays and demolition period )	Important condition
6	Supervision and reporting	Successful bidder will appoint qualified, competence technically experienced PMC (who have engineering license from Nasik municipal corporation ) to execute the work ,PMC will do all necessary monitoring , time to time test reports for all material and concreting , on every week progress report with photographs will be submitted	Mandatory condition

		,Contractor and PMC will do the jointly day to day supervision and quality control as per IS codes and at the end supervision certificate will be given by them. Office set up , laboratory , computer , A3 printer and internet connection facility will be done by contractor at site with his own cost.	
7	Electricity and water supply	Contractor will do his own arrangement for water and electrical supply at his own and charges for the same will be borne by contractor.	
8	Mobilisation advance	No mobilisation advance	
9	Material advance	No material advance	
10	Description of building	Ground floor work including strong room and demolition of old building.	
11	Construction area	Contractor has to give lumsum amount for building work including RCC staircase and water tank.	
		Additional work as mentioned in Sr. No. 15 - item no 7 to 11 is to be quote separately on lumsum basis .	You have quote separate item with respective finished item rate . If any work is deleted then your contract amount will be deducted accordingly ..
12	Changes in specification	Any addition or deletion in item will be paid or recover as per DSR 12-13 DSR. And non DSR item will be paid as per Material + labour +15 % over head and profit + Taxes .	
13	Drawing along with tender	All given drawing are tender drawing , any changes in particular item / in drawing-design will followed by contractor , it's actual + or - difference will be as per DSR 12-13 .	
14	Measurement of construction area	Outer periphery of building will be measure for payment to contractor. Area of payment as mentioned above .	
15		Following work is the part of this tender and to be execute by contractor and its expenditure will include in quoted rate i.e. it will not paid separately.– <ol style="list-style-type: none"> <li>1. Water tank – Over head RCC water tank 20,000 lit. at second floor level ( includes additional one floor RCC and ancillary work)- which is included in basic building work.</li> <li>2. Staircase tower with RCC top at first floor .( included in basic building cost )</li> <li>3. All external and internal sanitary and plumbing</li> </ol>	

		<p>arrangement with fixtures. ( included in basic building cost )</p> <p>4. Storm water and rainwater down take.</p> <p>5. Site development – Leveling , cleaning etc.</p> <p>6. Gate and compound included in basic rate of building .</p> <p><b>Separate item</b></p> <p>7. Under ground - 50,000Lit with all require plumbing and pumping arrangement , level indicator . -</p> <p>8. RCC Septic tank size -5.1 x2.0X 1.8 mtr and soak pit size - for 50 user</p> <p>9. Coloured Paver block 80 mm thick with RCC curb wall 300 mm depth along all peripheral margin. Quantity – 280 sq.mtr .</p> <p><b>10. Demolition of old building and all scrap will be contractor's property and all material will be disposed or carting away by contractor on his own risk.</b></p> <p><b>11. ACP and glass curtaining work with require fabrication stability of work .</b></p>	
16	<b>Building specification</b>	<b>For all items latest IS code is to be follows, see detail specification and brand along with this . All items is considered as final finish work it included in- between all civil work.</b>	
A	Excavation	Footing depth 2.4 mtr below natural ground level in all types of strata includes re-filling , carting of excavated material .	
B	Anti termite treatment	In excavated pit , at periphery of building , open to sky area . walls - with	
C	PCC below footing	Concrete grade – 1:3:6 - 150 mm thick	
D	Plinth level	0.90 mtr above existing road level .	
E	Floor PCC	Concrete grade – 1:3:6 - 150 mm thick	
F	Floor height	Floor to floor height is 4.00, parapet 0.90 mtr . to be match with existing currency chest structure .	
G	Plinth filling	With Hard murum – Can use if excavated material is good or will be brought from out side.	
H	RCC work	All RCC work is in M-20 ,if site mix with min. cement contain 8.4 bag per cu. Mtr . , In case of RMC – M-25 is to be use instead of M-20 as mentioned in structural drawing ,with Ultra tech cement min. 400 KG per Cu. Mtr. Without fly ash . ( no extra cost)	
	<b>Strong room RCC work</b>	<b>Strong room 's all four side pardi walls , raft/ bottom slab and roof slab - all are with RCC M-20 – 300 mm thick , and with double jail of 12 mm dia. 150 c/c in both way in staggered manner so in front view grid will look like as 75 mm c/c . as per RBI norms along with fixing of strong room door and ventilator ( this door and ventilator will be provide by bank)</b>	
I	Brickwork in	IIInd. class Fly Ash Brick masonry in C.M. 1:6 is provided in	

	substructure	foundation and plinth of external walls, steps, Damp proof course provision is to be made	
J	Brickwork and R.C.C. work in Superstructure	The external Brick masonry wall 230 mm/ thick or 150mm or 115mm or as specified, internal brick masonry wall of 230mm, 150 mm. or 115 mm. thick is proposed for internal walls All the structural concrete	
K	Lintol	Lintols are along all wall – No cut lintols	
L	Window Chajja	All window Chajja – 0.45 mtr projection at top and three side 0.30 mtr – Box type for all sides .	
M	Internal plaster	All Brick work and RCC surfaces is to be plaster with 20 mm thick to vertical portion like wall and 12 mm thick to slab with POP punning .	
N	External plaster	In- situ type	
O	Flooring	Vitrified 605 x 605mm Asian Evita Classi Series at all places and In Strong room - Kotah flooring - .45 mtr X 0.60 mtr , Hand cut , with mirror polish .	
p	Toilet flooring /dado	Anti skid ceramic tiles Toilets:-Matt finished Vitrified tiles 600x600mm flooring of approved color and RAK make, dado of Glossy vitrified tiles of RAK make & approved color, Granite pencil molding 19mm thick at lintel / sill level, 19mm granite slab & sill level with specified moldings, chamfers, rounding, etc.as specified. 19mm thick granite ledge in WC & toilets, 19mm thick granite door frame with beveled edge ( all blue and white combination)	
Q	Toilet dado	300x 450 mm up to 2.4 mtr level on all sides. ( includes back coat ) with 19 mm granite border at top	
R	Staircase Tappa and riser	Tread 300 mm , Riser 150 mm , Full size Kotah tappa with 2 groove 12 mm spacing and anti skid strip .	
S	Staircase railing	75 mm RCC Pardi up to 0.75 mtr and above that 50 mm 304 S.S .pipe with support at top . on both side.	
T	Plinth protection	Provision of plinth protection consisting of 80 mm. size metal soling with 10 cm. thick bedding in C.C. 1:2:4 is also made along with concrete/Shahabad kerbing & spreading black metal stone of 12-20mm thickness on Hard murum ( min. depth 0.45 mtr )	
U	Parapet wall	0.90 mtr height at all periphery and open to sky duct and wherever require as per safety norms.	
V	Doors	All door are in CC TW - frame section – 150 x 80 mm and all door are 32 mm flush door with both side lamination. with all brass fixture .	
W	Window	All window are with M.S. grill with 12 mm bright square bar with 75 mm spacing <b>both way</b> with additional vertical MS strip 25x5 mm 600mm c/c . All jams and soffits ( i.e. all sides) will be in black granite . All window are	

		powder coated aluminum in 1" each heavy track- 3track + 1 track for SS mosquito net and 4mm thick plane modi float glass, locking arrangement , handle , figure touch bearing etc. Complete.	
X	Ventilator	All as above with size 0.6 x 0.6 mtr with louvered arrangement. , with SS mosquito net and glass arrangement in staggered manner for ventilator grill as mentioned above .	
Y	Collapsible gate with rolling shutter	In front entry and in the bay in front of staircase collapsible door is to be provide with 2.4 mtr height and above portion will be close by MS grill in in 12 mm bar section in window grill pattern. For all external entry ( 2 no. ) and for ATM  All these gate will have rolling shutter also with 18 gauge MS sheet , with all accessories and heavy duty locking arrangement. Includes painting .etc .	
Z	Main entrance door	12 mm toughen galss with heavy duty floor spring , handle , locking arrangement, handle etc. for main and ATM entry.	
za	Toilets block and toilets	Includes all types of internal external plumbing and sanitation arrangement and all fixtures like WC – Indian ( 1 wherever 3 set of WC in rest all European)and European , wash basin with granite counter , urinals with partition , towel rod , soap dish , mirror , etc, in each unit. It also includes spout , water proofing , all type of taps , valve , etc complete up to all finishing with all respect.	
	Water supply and sanitary - specification of material	water supply lines 15mm -50-mm. thick GI pipe TATA/ZENITH make "C" class. Internal water supply lines 15 to 50 mm. dia CPVC Astral Make. SWR UPVC down take pipe 160 mm. dia of Prince/ Kisan/ Finolex make. UPVC soil/vent E/Waste pipe of 75/110/160 mm. dia. PVC p traps 110 mm. dia. wheel valve 50 mm. dia. Or as specified, stop cock/lip cock. CPVC pipes of 15-50 mm. dia. for internal & external water supply Orissa type white glazed earthenware W.C.pan of Parry ware make with Jaquar flush valve. White vitreous Parryware Cardiff wall hung WC with CP Flush valve of Jaquar make (concealed type).	

		<p>Parryware white glazed earthenware flat back urinal with integrated EFS &amp; CP fixtures of Jaquar</p> <p style="text-align: right;">continenta</p> <p>I make..</p> <p>Concrete pipes is NP.2 class 150/300/450 mm. dia.</p> <p>salt glazed gully traps, B.M Inspection chamber 60 x 45 cm/ conical chambers 2/ 0.53 M. dia 25 to 30 mm. thick partitions of white/color marble.</p> <p>Stainless Steel sink of size 600 x 450 x 250 mm of Nirali make(Grace Plane).</p> <p>Mirrors 450-x550 mm. Size, wash hand basin white glazed earthenware 55 x 40-cm with CP fixtures.</p> <p>Jaquar make vitreous china recessed toilet paper holder, C.P. soap Dispenser of Tecnocrats, Jaquar make</p> <p>Continental series CP rob hook, Hand Dryers of Tecnocrats make,</p>	
Zb	Painting	<p>Provision of Painting is made as follows:</p> <ol style="list-style-type: none"> <li>1. primer coat and plastic emulsion in royal make in ceiling unless specified.</li> <li>2. primer coat, plastic emulsion paint od Royal Make for internal wall surfaces in two coats.</li> <li>3. 2 coats of polymer based external paint of standard manufacture like Apex from Asian paint etc., and above that TEXTURE PAINT WITH GROOVE DESIGN</li> <li>4. Oil paint in two coats for concrete / WOODEN frames is made.</li> <li>5. For Steel surfaces :- anti rust primer with epoxy coating in 2 coats for all steel surface unless specified.</li> </ol>	



Zc	Waterproofing	Providing cement based waterproofing to terrace slab (India waterproofing is made for terrace as well as Toilet block as per the Relevant specifications), for water tanks internal area china mosaic water proofing is provided. In terrace of main bldg. Clay tiles of make A Albuquerque (manglore) of size 0.3x0.3 and in specified pattern over the India water proofing is proposed. Rough shahabad Box type Waterproofing 40 to 50 mm. thick for lift & retaining wall base & wherever specified and 20 to 25 mm. thick for lift walls & other areas as specified, upto plinth ht. is made. It also includes the gola to all corner , On parapet top Kadappah with water groove is to fix.	
Zd	ACP work	It includes 2.0 mtr canopy in fabrication. Aluminium Composite Cladding with 4mm thick ACP sheet, using 50 X 50 mm Tata tubular sections or as per manufacture's requirement including welding, and necessary fixtures , one coat of anticorrosive paint, weather silicone and VHB tapes, include all scaffolding, all incidental charges. ( stability will be given by contractor)	
ze	Fan hook	Provision of 1 fan hook for every 120 sq.ft	
zf	Steel	Reinforcement steel – only integrated steel - TMT 500 FE -TATA , Arceller mittal , SAIL	
zg	Cement	Ultratech for RCC , for other work Ambuja ,Manigarh	

Detailed schedule for Running payment for lump sum offer

Items to be carried out	% of Total Payment	The cumulative should not be more than
<b>1) Demolition of old building</b> <b>2) On Completion of Construction upto Plinth Top level.</b> <b>A) Cleaning of site and Excavation in different strata's.</b> B) Foundation concrete & Floor Bedding in C.C. 1:3:6, R.C.C. Column footings, columns up to plinth top, ground & plinth beams all in RCC mentioned grade & corresponding reinforcement steel Fe500 or as specified. C) Anti termite treatment & Damp proof course D) Plinth filling & rubble soling. E) Brick masonry in substructure up to plinth top.	20 %	20 %

<b>3) On Completion of Construction from plinth top to top of ground floor slab.</b> Stage 1 - For all RCC work ( slab ,column , beam , lintol , chajja , pardi etc. excluding Brick work – Stage 2 – Brick work ground floor .	25 % 10 %	45 % 55%
<b>4) On Completion of Construction from Ground floor slab top to top of first floor slab.- Staircase portion only</b> Stage 1 - For all RCC work ( slab , column , beam , lintol , chajja , pardi , strong room )etc. excluding Brick work – Stage 2 – Brick work ground floor .	5% 3%	60% 63%
<b>5) On Completion of Construction all remaining RCC work – staircase tower , water tank on staircase tower , tank height 1.5 mtr etc.</b>	5%	68 %
<b>6) Ground floor -</b> On completion of M.S. grill ,aluminum window internal plaster ,and flooring	5%	73%
<b>7) First floor -</b> On completion terrace door ,, internal plaster ,and flooring , <b>tappa , railing . etc complete .</b>	2%	75%
<b>8) On completion of terrace waterproofing</b>	2%	77 %
<b>9) On completion of all doors and windows</b>	2%	79%
<b>10) On completion of external plaster</b>	5%	84%
<b>11) On completion of all toilets with all fixtures , external and internal plumbing and sanitation ,rain water down take, storm water septic tank, soak pit etc complete</b>	3%	87%
<b>12) On completion of internal and external painting .</b>	3%	90%
<b>13) On completion of all site development - virtual completion. ( subject to all above completion)</b>	5%	95%
<b>14) Hand over the premises with as build drawing , waterproofing &amp; ant termite treatment guarantee for 7 years on 100 stamp paper , handing over all guarantee / warrantee paper for various fixtures / material used in project. , satisfactory completion report from consultant and owner in writing.</b>	5 %	100 %

Note :-

1. Payment will be made on stage wise completion only . Part stage completion will not be paid or will not adjust for subsequent stage completion .( i.e 1<sup>st</sup> stage not completed fully and second stage partly completed , so request of stage 1<sup>st</sup> payment fully will not be consider)
2. At every stage, retention money will be deducted 4 % ( as 1 % already submitted as EMD ), that total 5 % will treat as SD amount.
3. 50 % SD will release after last stage of completion ,on request from contractor.
4. Remaining 50 % amount will release after defect liability period and on submission of 10 % ( 10 % of total SD amount ) bank guarantee for 7 years for water proofing and ant termite treatment. Other wise only 40 % amount will be release.
5. Payment will be made after deduction of statutory taxes / deduction.
6. LBT , VAT and S.tax and other require registration are compulsory .
7. If VAT /S. tax not applicable to you then do not participate in tender , that bidder will treated as less experienced bidder and they have not taken these registration because

of very less turnover.( If any other reason , contractor can put up before tender submission , in writing)

8. Sign every page of tender documents .

**OTHER DOCUMENTS**  
**INDEX**

<b>SR. NO</b>	<b>SECTION NO.</b>	<b>DESCRIPTION</b>
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3.	SECTION – 3	MINIMUM SAFETY RULES
4.	SECTION – 4	SPECIAL CONDITIONS OF CONTRACT
5.	SECTION – 5	GENERAL CONDITIONS OF CONTRACT
6.	SECTION – 6	BANK GUARANTEE FORMAT
7.	SECTION – 7	BILL OF QUANTITIES
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## SECTION – 1

# **INSTRUCTION TO BIDDERS**

## SECTION – 1

## INSTRUCTIONS TO BIDDERS

- Inquiry No. :
- Works : Construction of SATPUR BRANCH -BANK OF MAHARASHTRA
- Location : S.NO NASHIK
- Owner : SATPUR BRANCH -BANK OF MAHARASHTRA .
- Consulting engineers : Tare and Associates , 14, 1<sup>st</sup> Floor , above Hotel pathik , Shalimar, Nashik.

Bids are invited for **construction of SATPUR BRANCH -BANK OF MAHARASHTRA** in S.NO  
NASHIK

All expenses incurred for preparing and submitting the bid, attending meetings, site visits and all such expenses otherwise associated with this bid shall be borne solely by the bidder.

1. The original bid must be signed by an authorized officer, enclosed in a sealed envelope, and hand delivered to the following address not later than 16.00 Hrs. on . 2014 . The envelope shall be marked "Confidential scribing inquiry no. and work description.AGM , SATPUR BRANCH - BANK OF MAHARASHTRA .
  2. Period of Performance :  
time is the essence of this contract and work must be completed within the stipulated time, (which is specifically mentioed in first page ) months (including the period of monsoons). the successful bidder to commence work within one week, after receipt of letter of intent and complete the work progressively as per the priorities indicated, including all clean up and acceptance of the work.
  - 5 Owner does not bind himself to accept the lowest or any bid and reserve to accept or reject any or all bids without assigning any reason therefore. The successful Bidder shall be expected to proceed with the work on receipt of Letter of Intent pending preparation and execution of a Contract. Bid shall be firm and cannot be withdrawn, subject to acceptance within 45 (FORTY FIVE) DAYS from the date set for the receipt of bid.
  - 6 The Bidder is advised to visit the site and to carry out any tests and/or investigations he considers necessary before submission of his Bid to assess the extent and nature of any difficulties and risks likely to be encountered and take account of such matters in his proposal. shall be given advance intimation of intended site visits and nature of tests / investigations to be carried out.
  - 7 The Bidder is to inform Tare and Associates, Consulting engineers in writing, of any matters requiring further information or of any discrepancies that may be discovered which require settlement before the completion of the Bid. Request for clarifications from the Bidders shall be received up to on and clarifications and interpretations shall be issued by up to 16.00 Hrs. on----- . The bid document complete in all respects in accordance with the requirements as mentioned therein shall be issued by., SATPUR BRANCH -BANK OF MAHARASHTRA. up to 16.00 p.m. on -----  
-
- The bid document complete in all respects in accordance with the requirements as mentioned therein shall be received in the Office of SATPUR BRANCH -BANK OF MAHARASHTRA .RO office Nasik
- 8 Request for clarifications and interpretations shall be addressed in writing to the following individual:  
**Tare and Associates ,**

14, 1<sup>st</sup> Floor ,above Hotel pathik , Shalimar, Nashik  
Tel. No. 0253 – 2502727. Mob - 9823082027  
E-mail : mmtare@yahoo.com

- 9 All information comprising in this document, including all drawings, specifications, or other appended or related data, are the property of the Owner and are provided only for the purpose of preparing and submitting a bid. All information contained or referred to in this document shall not be disclosed or released for any purpose.
- 10 One (1) copy of relevant tender drawings and the Technical Specifications shall be furnished to each Bidder.
- 11 Bidders must fill in all blank spaces in the proposal in neat, legible and correct entries. Alterations / erasures in figures should be avoided.
- 11.1 Bid shall be signed, dated and witnessed at all required places. All pages, drawings, corrections / alterations shall be initialed.
- 11.2 Bid must be accompanied by a Photostat true copy of the Power of Attorney in favor of the signatory to the bid, which entirely empowers him/her to bind the firm to the agreement in accordance with the general conditions, as amended. However, if it is a proprietary or a partnership firm, proprietor or partner can sign with attested copy of partnership deed along with partnership firm, proprietor or partner can sign with attested copy of partnership deed along with partnership firm registration certificate attached.
- 11.3 If no bid is submitted, it shall be marked prominently “NO BID” on the envelope and signed by the authorized person.
- 11.4 The Bidder shall be deemed to have included allowance in his rates for the provision, maintenance and final removal of all temporary use or particular shed / work will be measured and paid for separately. Details of temporary works shall be given in the Method of operation accompanying the proposal including the area required for same.
- 11.5 The rates by the Bidder shall be deemed to have been inclusive of all wastage in basic and consumable materials required to execute the items and also inclusive of all taxes, levies, octroi any duties by local bodies and state or central government or any other public bodies except VAT & Service Tax.
- 11.6 Bidder is advised to submit his proposal based strictly on the terms and conditions and specifications contained in the bid document and not to stipulate any deviations. However, in case if becomes unavoidable, deviations should be stipulate with reference to the clause number and page number of the inquiry document, etc. During the bid evaluation, financial implications of such deviations will be considered.
- 11.7 Construction Schedule : Bidder shall provide the following information with his bid.
- 12.1 A resource loaded Construction Schedule, in a computerized bar chart form acceptable to the Owner covering each element and phase of the project, indicating the following :
  - 12.1.1 Activity description
  - 12.1.2 Activity duration
  - 12.1.3 Start date and finish date
  - 12.1.4 Resources to perform each element and phase of the work
- 12.2 The list of resources including plant and machinery proposed to be deployed and the Organization chart.
- 12.3 A CURRICULUM VITAE OF KEY PERSONNEL TO BE ASSIGNED TO THIS PROJECT including a Senior English speaking construction superintendent at the Work Site should be submitted along with the bid. The assigned Key Personnel shall not be replaced without Tare and Associates, Consulting engineers prior written consent, which will not be unreasonably withheld.

Thanking you,

Yours faithfully,

For SATPUR BRANCH -BANK OF MAHARASHTRA .

**SD\ - XXX**

**Short List of enclosures to the Bid duly initialed / signed / stamped.**

- 1 Tender fees..... & Demand Draft/ of Rs. /- towards Earnest Money Deposit.
- 2 Section (3), (4), (5) and (6) issued along with Tender Document.
- 3 Tender document Section (7) i.e. Bill of Quantities with rates and amounts duly filled in.
- 4 Copy of Power of Attorney of the signatory to the Bid.
- 5 Construction Schedule.
- 6 Organization chart with CVs of key personnel to be deployed at site.
- 7 List of Plant – Equipment to be deployed at site as per list attached ( Annexure – 1)
- 8 List of similar jobs or similar building carried out during last five years /jobs in hand, along with their magnitude in quantity and in rupees and also their time schedules planned / achieved as per Annexure – II
- 9 Attested copies of up to date and for three preceding financial years Income Tax and Sales Tax clearance certificates.
- 10 Schedule of sub contractors.
- 11 Schedule of monthly labour force.
- 12 Schedule of monthly power consumption including peak power requirement.



**Annexure - I**

Bidder to indicate a list of equipment he intends to deploy at the site for timely execution.

<b>SR.NO.</b>	<b>TYPE OF EQUIPMENT</b>	<b>NOS.</b>	<b>CAPACITY</b>	<b>OWNED OR HIRED</b>
1	Excavators			
2	Poclains			
3	JCBS			
4	Bull Dozers			
5	Mechanical Compactors			
6	8-10 T Rollers			
7	Dumpers			
8	Tippers			
9	Welding Sets			
10	Plate Cutting Machines			
11	Plate Bending Machines			
12	Manual Grinding Machines			
13	Concrete Mixers			
14	Concrete Vibrators			
15	Vibro roller			

**SECTION - 2**

**SCOPE OF WORK- GENERAL**

## SCOPE OF WORK-GENERAL

SATPUR BRANCH -BANK OF MAHARASHTRA . The SCOPE OF WORK shall consist of providing all labour, supervision, permanent material and equipment (except as provided by Owner as set forth elsewhere herein) and consumable materials, construction equipment, tools temporary facilities (i.e. electrical power, sanitation facilities and water), warehousing, insurance, applicable permits and license, taxes and duties, inspection & testing, and all other things necessary to complete the works in accordance with Contract Documents.

### 1.0 GENERAL :

The requirements set forth herein apply generally to above described job at the SATPUR BRANCH -BANK OF MAHARASHTRA. The area is demarcated on Site Plan drawing and other referenced drawings.

1.1 Broadly, the scope of work includes the following :

a) **Proposed construction of SATPUR BRANCH building**

### 1.2 In general, the scope of work consists of the following : -

1.2.1 Area clearance and leveling.

1.2.2 Line out of buildings.

1.2.3 Trimming of existing excavation to desired final levels and shape.

1.2.4 Civil, structural and general civil works.

### 1.3 Examination.

1.3.1 CONTRACTOR shall examine the drawings and specifications provided and shall visit the site and determine the nature of existing conditions. In no circumstances will any claim against the OWNER be allowed resulting from failure to ascertain the work herein described or implied.

1.3.2 CONTRACTOR shall report to Owner and / or Tare and Associates, Consulting engineers in writing any conditions which will prejudice the proper completion of the work. Commencement of the work constitutes ACCEPTANCE OF EXISTING CONDITIONS.

### 1.4 Protection.

1.4.1 CONTRACTOR shall provide and be responsible for all necessary side rails, guard-rails, markers, including temporary warning lights or other means required to ensure that no damage, injury or death is caused to persons or damage to property resulting from this work.

1.4.2 CONTRACTOR shall erect an open excavation barricade immediately following any excavation work. Additionally, CONTRACTOR shall maintain said barricades on a daily basis. If CONTRACTOR fails to perform these responsibilities on a daily basis, OWNER may exercise its' right to perform these functions. All charges incurred by OWNER shall be debited to the CONTRACTORS account.

1.4.3 CONTRACTOR shall protect the work of other Contractors in progress of completed and protect the owner's properties, stored products and materials, services and utilities from damage.

1.4.4 Whenever the Contractor carries out any operation, the contractor shall take all protective measures to prevent any damages to the life and property in the vicinity and the work should progress under the supervision of a person qualified to carry out the operation.

### **1.5 Environmental Protection :**

1.5.1 Dust Control : CONTRACTOR shall provide and maintain an adequate system to avoid any nuisance caused by dust and dirt rising throughout the area of operations.

1.5.2 Silt control : CONTRACTOR shall provide and maintain control systems to prevent silt from entering any storm drainage system during the progress and until such time till the work is completed and handed over.

1.5.3 CONTRACTOR will maintain a clean, hygienic and safe work site at all times. Remove from site all waste and surplus materials resulting from the work on a daily basis. If CONTRACTOR fails to perform these responsibilities on a daily basis, OWNER may exercise his right to perform these functions. All charges incurred by OWNER shall be debited to the contractor's account.

### **1.6 Dewatering**

1.6.1 CONTRACTOR shall build temporary ditches and kuchha drains as per the instructions of Owner and/or Tare and Associates, Consulting engineers to prevent surface water from flowing into excavations or damaging adjoining property/ areas affecting in the vicinity.

1.6.2 CONTRACTOR shall keep excavated areas free from standing water using mechanical equipment and drain away water from excavations, buildings, walls and paved areas to disposal areas approved by Owner and / or Tare and Associates, Consulting engineers.

1.6.3 CONTRACTOR shall protect open excavations against flooding and damage due to surface run-off.

1.6.4 If necessary, CONTRACTOR shall excavate temporary pits for water storage and drain out water from site, backfill pits with material to match adjoining strata, compact such backfill and match adjacent level conditions prior to completion of the work.

**1.7 CONTRACTOR** shall maintain and keep access roads clean which are used for hauling operations as required by local and site authorities.

**1.8 CONTRACTOR** shall be deemed to be self sufficient and shall, as part of the SCOPE OF WORK, supply, transport, install, properly maintain and remove all temporary construction facilities and utilities constructed to support the SCOPE OF WORK after the work is completed. The type of facilities and/or utilities, their location on the job site, and the dates which they are brought to or removed from the job site shall be co-ordinate with and are subject to the prior approval of Tare and Associates, Consulting engineers. The CONTRACTOR shall provide distribution of all electrical power and water required to perform its work (Owner shall provide electrical powder and water at one location within Plant).

### **1.9. Inspections :**

1.9.1 The CONTRACTOR shall, as part of its Quality Control Plan, provide for a comprehensive inspection and testing programme by OWNER approved testing laboratory. OWNER/ and or Tare and Associates, Consulting engineers reserves the right, but not the obligation, to perform random tests on contractor's work at the expense of the contractor.

- 1.9.2 The CONTRACTOR shall arrange for all materials procured by it to be tested at the expense of the contractor. The OWNER and/or Tare and Associates, Consulting engineers reserves the right but not the obligation to witness these tests.
- 1.10 The CONTRACTOR shall conform to the requirements of relevant and latest Indian Standards as specified in the Specifications. The CONTRACTOR shall perform its work in accordance with the established tolerances of the standards and /or these Specifications.
- 1.11 CONTRACTOR shall clear the site of any obstacles and establish the grid lines with respect to the reference co-ordinate at site and get the same approved by the Owner/ and or Tare and Associates, Consulting engineers.
- 1.12 CONTRACTOR shall provide all Horizontal and Vertical Control for all new –Construction as necessary. CONTRACTOR shall establish temporary Bench Marks at the site with respect to the permanent site Bench mark and get the same approved by the Owner/and or Tare and Associates, Consulting engineers.
- 1.13. Spoil material : CONTRACTOR shall remove all excess earth material to an area to be determined later in the project site.
- 1.14. If OWNER instructs the CONTRACTOR to disposes off the unusable excess excavated stuff out side the factory premises, the CONTRACTOR shall arrange for the suitable dumping yard out side factory premises at his own risk and cost and in such condition CONTRACTOR shall be responsible for obtaining any statutory permissions, legal permissions, royalty, payments, taxes, duties etc.

**SECTION - 3**

**MINIMUM SAFETY**

**RULES**

The following are Minimum Safety Rules that apply to all contractors and subcontractors associated with this project. All project personnel have a duty and responsibility to ensure familiarization with project safety requirements and to comply with all requirements established by their employer.

1. **REPORTING HAZARDS** : It is part of each employee's job to report all unsafe conditions/ practices to his immediate supervisor for corrective action.
2. **BASIC PERSONAL PROTECTION** : for this project include :
  - a) Safety hats of the approved type which meet Indian Standard shall be worn while on, construction sites (hats shall not be Pressed or altered in any way as to make them defective). Hard hats shall be worn the way they are intended to be worn. Metal hard hats are prohibited.
  - b) Industrial grade safety glasses with side shields meeting ANSI, standard Z.-87 or equivalent Indian Standards will be worn by all personnel. This also applies to all persons wearing prescription glasses. Additional eye protection may be necessary for various work activities such as grinding, chipping, drilling, chemical handling, etc.
  - c) Hearing protection will be worn at posted high-noise areas or work activities generating high-noise levels.
  - d) Shirts are required when working on a construction site. All shirts will have sleeves. Sleeveless shirts are not permitted.
  - e) Full length trousers are required and must fit properly. Loosely fitting clothing will not be worn.
  - f) Safety slices or safety boots will be worn in the construction area at all times. No sneakers, open-toed shoes or tennis shoes are allowed. All shoes will be suitable to the construction environment.
  - g) Gloves will be worn when handling materials that may cut, tear or burn hands. Gloves will be in good condition and free of excessive oil or grime.
3. **RESPIRATORS** : Persons engaged in work activities requiring breathing apparatus or respirators should have the respirators test-fitted to ensure a proper seal and fitting.
4. **FALL PROTECTION** : Safety Belts/ Harnesses shall be worn and used when working at two meter heights (or greater), where approved platforms, ladders, or scaffolds are not provided Lanyards will be no more than six feet in length. Horizontal or vertical melines will be provided and used where no tie-off points are provided. Belts/Harnesses shall be worn properly. All fall protection equipment will be inspected for defects by the user before each use. Defective or questionable protection equipments shall not be used.
5. **INJURIES** : All persons must report all injuries to their supervisors and obtain first aid (regardless of degree of severity) at the contractor's first aid facility. Each accident must be documented on the Accident Notification Report.
6. **SMOKING** : Smoking within an establish NO SMOKING AREA is strictly prohibited and is sufficient cause for immediate removal of the person found smoking from the site.
7. **ELECTRICAL EQUIPMENT** : Personnel (except electricians), assigned to work on or around specific electrical jobs, will stay clear of all electrical equipment until it is proven safe by qualified electrical personnel.
8. **UNAUTHORISED USE** : The unauthorized operation of any tool, equipment, switch, vehicles, values, etc. is strictly prohibited. All electrical connections will be carried out by wiremen holding valid a license.
9. **MAKESHIFT DEVICES** : Personnel will not fabricate or use makeshift devices such as lifting devices, tools, etc. Specialized tools/ equipment are often necessary, but will be properly designed and

tested by authorized engineering personnel before use. The modification of tools/ equipment or the overriding of safety devices will not be tolerated.

10. **TRUCK RIDING** : Riding in the bed of trucks is prohibited unless seating arrangements conform to client requirements. Personnel are forbidden to ride on loaded trucks, fenders, running boards, sideboards, tailgates, etc.
11. **SEAT BELTS** : All personnel riding in vehicles will fasten seat belts before the vehicle is placed in motion.
12. **HORSEPLAY** : Running, practical Jokes, etc. prohibited. Fighting is sufficient cause for immediate dismissal. "Short cutting" of established safe practices or deliberate chance taking is strictly prohibited.
13. **WORK PERMITS** : If work to be carried out requires a permit, the permit must be obtained before work commences. Work permits are required for following jobs :
  - 1) Working at heights more than 2 m.
  - 2) Working with welding machine, gas cutters, breakers.
  - 3) Working in confined space.
  - 4) Working on electrical installed area.
  - 5) Working inside bonded area like LPG, HS, etc.
  - 6) Excavation permit.
14. **EMERGENCY PROCEDURES** : It is part of everyone's job to thoroughly know plant emergency procedures, emergency alarms, location of assembly areas, etc.
15. **WORKING POSITION** : Personnel must always ensure safe working positions. Any person to position himself between a fixed object and a moving piece of equipment is extremely hazardous Never place yourself between objects which could roll, shift, fall or displaced. Stay alert to conditions around you at all times.
16. **SAFE & PRESCRIBED METHODS** : All tools and equipment, including motor vehicles will be operated in a safe and prescribed manner at all time. If any person is not sure of the proper method of tool/ equipment use, he must immediately inform his Supervisor for the person to receive proper direction.
17. **INSTRUCTIONS FROM SUPERVISORS** : Supervisors are responsible for strict compliance and enforcement of project and client, "Safety rules and regulations, and to ensure that workers are made knowledgeable of requirements. All personnel are required to follow instructions from their immediate supervisors, If instructions are not clear or are confusing, the employee has a responsibility to question the supervisor and obtain clear instructions before commencement of work.
18. **SAFETY AUDIT** : Regular safety audit reports must be submitted fortnightly.
19. **COOPERATION AND TEAMWORK** : It takes co-operation and team work to complete construction projects in a safe, efficient and timely manner. All project personnel are expected to render complete co-operation in the administration and enforcement of the project Safety Program.
20. **CAMERAS** : Employees must not, under any circumstances, bring cameras onto the work site or use a camera on the work site without written approval.
21. **DRUGS/ ALCOHOL** : The use of illegal drugs and alcohol is strictly prohibited and is cause for immediate removal of the person who is found to be under influence of such drugs/ alcohol from the site.
22. **DISCIPLINARY ACTION** : Disciplinary action will be taken against persons violating the stipulations. Serious infractions and/or repeat offenders will be dealt with severely, up to and including permanent removal from the project.



- 23. RESPONSIBILITIES :** All persons have a responsibility to themselves and their co-workers to be physically fit and mentally alert at all times. Conditions on construction site are always in a state of change. Personnel must be able to react accordingly.
- 24. LADDERS AND SCAFFOLDS :** All ladders and scaffolding shall be of the approved type. Ladders and scaffolding not meeting standards shall be removed from service. Ladders and scaffolding shall meet Indian Safety Standards or British Standards whichever is more stringent.

**LADDERS :**

- a) Ladders shall be inspected prior to use. Defective ladders shall be removed from service.
- b) Ladders used near energized lines or equipment shall be made of non-conductive materials (wood, fiberglass, etc.)
- c) Ladders shall be placed on solid footing they shall not be placed on unstable objects such as loose bricks.
- d) Employees shall not carry tools, materials, or objects while climbing ladders. Employees shall face the ladder while climbing and avoid leaning from side to side and away from the ladder.
- e) Employees working from ladders shall wear and utilize proper fall protection equipment.
- f) Straight and extension ladders must be secured at the top when in use. Ladders not in use should be removed from the vertical position.
- g) Ladders must be placed at an angle not to exceed one foot of run for every four feet of rise.
- h) Ladders must extend above their upper support or landing by at least 3 feet.
- i) Step ladders must be secured or held when in use.
- j) Employees shall not work from the top step or next to the top step of step ladders.

**SCAFFOLDS :**

- a) Employees shall not erect, alter or dismantle scaffolds unless directed by a competent person.
- b) Scaffolds shall be erected, should be in plumb, and on sound foundation. Loose bricks, unstable slacks of lumber, etc. Shall not be used to level or support scaffolds.
- c) Scaffold materials shall be free of defects.
- d) Work platforms shall be completely decked. (The decking should overhang its end supports at least 6 inches but not more than 12 inches. The decking shall be secured in place).
- e) Work platform shall be equipped with standard handrails, midrails, and toe boards when 2 meters or more in height.

**25. EXCAVATIONS :**

- a) When deeper than 5 feet, excavations shall be sloped or shored to prevent caving-in.
- b) Excavations must be barricaded and barricades shall be maintained till back filling is completed.
- c) Excavated earth and any equipment shall be kept at least 2 feet from the edge of excavation.
- d) Access ladders shall be placed within a distance of 25 feet of location of working in excavations of 4 feet deep or deeper.

**26. CONFINED SPACE OR VESSEL ENTRY :**

- a) Employees shall not enter any confined space unless it has been tested for oxygen contents, absence of flammable gases and/or substances, or any other hazardous materials, and a written permission has been issued.
- b) A man way watch trained in his duties shall be present at any time when personnel are inside confined spaces or vessels.
- c) Portable or hand-held lighting should not exceed 12 volts power source.
- d) Positive ventilation (air movers or fans) shall be used to provide exchange of fresh air in confined spaces and vessels.

**27. TAG-OUT, LOCK-OUT PROCEDURES :**

- a) Employees shall not perform any work including repair, changes, attachments on electrical circuits, equipment, or mechanical equipment unless the power supply or source of said

- equipment is positively disconnected or shut off and the concerned electrical department employee places his lock and tag on the disconnect.
- b) Only electrical personnel shall be involved in energizing & de-energizing electrical circuits and equipment.

\_\_\_\_\_  
Proprietor/Partner

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

**SECTION - 4**

**SPECIAL CONDITIONS**

**OF CONTRACT**

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**SECTION – 4****SPECIAL CONDITIONS OF CONTRACT**

1. Earnest Money Deposit along with Tender                      1 % of the quoted amount of tender by Demand draft in favour of M/s. DGM -BANK OF MAHARASHTRA.. payable at NASIK . Bidders shall not be entitled for any interest on the Earnest Money Deposit made by them. The Earnest Money Deposit of the unsuccessful Bidders will be refunded after award of contract or after expiry of validity / extended validity of the Bidder's offer. (Refer attached format of Bank Guarantee)
2. Deduction from running account bills towards Retention money be accepted                      4 % shall be made in Running Account bills. No Corporate Guarantee/Indemnity Bond shall be accepted in lieu of the Bank Guarantee.
3. Security Deposit ( S.D.)                      The Earnest money deposit submitted with the tender shall be converted as Security deposit for till the defect liability period. ( 1 % EMD + 4 % retention from RA = 5% = S.D.
4. Refund of Security                      The 2.5 % security deposit will be released to the Contractor on virtual completion and remaining 2.5 % after the expiry of the Defects Liability Period (12 months) from the certification of the final bill.
5. Period of final measurement and valuation                      1 Month
6. Mobilization Advance                      No mobilization advance shall be given.
7. Material advance                      Nil.
8. **Levies & Taxes :**  
No additional payments towards levies & taxes or any statutory payments to the government or local or statutory authorities shall be made by the owner. The rate quoted shall be deemed to include all levies & taxes, which may come in force till the successful completion of the project INCLUDING Vat & Service Tax.
9. **Escalation :**  
It should be explicitly understood by the Contractor that the rates payable to the Contractor are FIXED AND ARE NOT LIABLE FOR CONSIDERATION OF ANY ESCALATION towards any increase in price of building materials and labour or otherwise etc., during complete execution period of works,
10. **Supply of Materials :**
  - 10.1 The OWNER shall not supply any building material. The CONTRACTOR is required to procure all the material necessary for completion of all the construction activities under the scope of work.
  - 10.2 Contractor shall at his cost make his own arrangements for the storage of their construction material at the work site as specified / directed.
  - 10.3 Test Certificates of Cement, Structural Steel & Galvalume Sheet to be produced to OWNER from time to time (If requested by Client/Consultant).
  - 10.4 Test certificates of random samples of materials shall be furnished as directed by owner/consultants from time to time.

**11 BASIC RATES TO BE CONSIDERED - NO BASIC RATE FOR ANY MATERIAL**

Note: Structural Steel Material includes hot rolled structural members such as Angle, Channel, I Beam, Wide beams, only.( sheeting is not to be consider as structural steel )

- 11.1 In case, there is a variation in rates of the basic materials as listed in above sub para, rates of the items having major contribution of above materials, will be recalculated (for both, either positive or negative variations) taking into account the escalation / reduction of price of the basic materials but to be made applicable as below. ( not to be consider )
- 11.2 Any increase / decrease in the basic price of the cement up to 5% shall be absorbed/ reimbursed by the contractor. ( not to be consider )
- 11.3 Any increase / decrease in the basic price of the Reinforcement steel, Structural Steel, M.S. Plates and Chequered Plates up to 2% shall be absorbed /reimbursed by contractor. ( not to be consider )
- 11.4 In case there are delays attributed to contractor, such escalation will not be payable beyond the scheduled date of completion.
- 11.5 The rate difference for cement will not be paid for RMC jobs. The rates will be firm for RMC
- 12.** The owner shall provide water and electric power only for carrying out the work covered under this inquiry, at one location. All the expenses for the necessary network for distribution/ storage shall be borne by the contractor. . Water and electricity will be ARRANGE AND BORNE BY CONTRACTOR.

**13. Terms of Payments of R.A. Bills :**

- a) Payment will be released after detailed checking by Consulting engineers/Engineer-in-charge from SATPUR BRANCH -BANK OF MAHARASHTRA. including necessary deductions if any, scrutiny of quantities and other verifications with respect to contractual conditions within 15 (Fifteen) days from date of receipt of bill by owner.
- b) Minimum amount of R.A. bills shall be Rs. 10,00,000/- The final bill shall be submitted by the contractor within One month of the date of virtual completion certificate furnished by the Engineer-in Charge. Otherwise the certificate of the Engineer-in Charge of measurements and total amount payable for the work accordingly shall be final and binding on all the Parties.

**14.0 Time of Completion :**

- 14.1 Time is the essence of the Contract.
- 14.2 The over time of completion is **As mentioned** from the date of issue of letter of intent but the contractor shall complete the works as per the priorities laid down by the Owner during the currency of the contract as per the schedule attached as Annexure-II. The completion period is inclusive of monsoons, Sundays, holidays (Public/Festival) periods and no extension of time shall be granted on this account. During inclement weather, the Contractor shall suspend concreting for such time as the Owner/ Engineer-in-Charge may direct and shall protect from possible damages to all works which are in progress at that time.
- 14.3 The BIDDER shall submit along with the Bid a Schedule of Tools, Tackles & Equipment in working condition that he proposes to maintain at site at any stage during the Contract period to maintain the above stipulated progress. Also, the Contractor should bring to site any additional machinery as suggested by Engineer-in-charge for completing the work in stipulated time.
- 14.4 The Contractor shall arrange for replacement of any part/ parts or complete plant and equipment, in case of any breakdown, without any loss of time and should also have arrangements for stand by plant & machinery.
- 14.5 The work shall commence at site within **ONE WEEK** from the date of issue of letter of intent.
- 14.6 The owner reserves the right to split up the work among more than one Contractor at initial Contract award stage for economic reasons or during the progress of the work, due to unsatisfactory quality of work and/or progress of the Contractor. The Owner will not entertain any claim from the Contractor, as a result of such action on the part of the Owner.

- 14.7 Quantities indicated in BOQ are approximate and may vary individually on plus or minus side to any extent. Some items may not be operated during the entire progress of work. However, the total cost of work shall be within  $\pm 25\%$ .
- 14.8 If the Contractor fails to complete the work within the specified time as well as per the priorities laid down as per Clause 14.2 hereinabove, he shall be liable to pay liquidated damages to the Owner as set out in Clause 15.0 herein below :
- 14.9 The Contractor shall provide basic rates for labour (Skilled, semi-skilled, un-skilled), materials, tools, tackles, equipments, taxes, etc. These shall be used for deriving rates of extra items as per Clause 50 (IX)(b) of General Conditions of Contract.
- 14.10 It shall be clearly understood that the Owner will not entertain any claim from the Contractor for any idle time compensation for any reasons whatsoever.

**15.0 Liquidated Damages :**

- 15.1 Liquidated damages shall be charged @ Rs. 10,000/- per day up to a max. of 5 % of the contract value of the work.

**16.0 Bonus :**

- 16.1 There is no provision of Bonus under this contract and as such the Contractor is not liable for any additional remuneration towards bonus.

**17. Defect liability Period :**

12 months from the date of issue of completion certificate by the Engineer-In-Charge.

**18. Insurance :**

The BIDDERS shall allow in their bid the following insurances.

- a) Third Party insurance in respect of death or bodily injury to persons and/or and damage to property which shall be as follows :

Public Liability / Property Damage :

**Limits for each accident not more than Rs. 02 Lakhs, with upper limit of Rs. 10 Lakhs during any one year.**

- b) Workman's Compensation insurance : As set out in Clause No. 57 of General Condition of Contract.
- c) Contractor's All Risk Insurance.
- d) Worker's E.S.I.S. and P.F. coverage.

The Contractor shall take out and maintain for the duration of the Contract including the extended periods, if any, the above insurance coverage's.

**19. Income-Tax and Sales Tax Certificates :**

The BIDDERS shall submit along with their bid, attested copies of up-to-date and for three preceding financial years, income-tax and sales tax clearance certificates, without which the bid will be considered as incomplete and liable to rejection.

**20. Validity of Bid :**

The bid shall remain valid for acceptance for 45 (Forty five) days from the due date of receipt of bids and during this period, no bidder shall be allowed to withdraw his bid. In the event of any such withdrawal during the above said period it will cause the Earnest Money Deposit to be forfeited by the Owner.

21. Bids which do not fulfill any of the above conditions or are incomplete in any respect are liable to rejection.

22. Canvassing in any form is strictly prohibited, and any Bidder found to have resorted to canvassing shall be liable to have his bid rejected summarily.
23. The owner reserves the right to accept any bid, irrespective of whether it is the lowest or otherwise or to reject any or all bids without assigning any reasons therefore, or to split the Contract either at the initial contract award stage or during the progress of work due to unsatisfactory work or progress.
24. The Contractor shall provide his own watch and ward service for security of his materials, plant and equipment.
25. Contractor shall also depute a Safety Officer at Site to ensure that at necessary safety measures are taken by the construction group to avoid any eventuality, particularly at the time of blasting and deep excavations. The Safety Officer shall ensure compliance of minimum safety rules as per Section-6.
26. Space for the Contractor's site Office & laboratory, godown, workshop and assembly; yard etc. will be allocated by the Owner, as close to the job site as possible and given free of charge to the Contractor. The Contractor shall construct at his cost all. The above mentioned temporary structures in accordance with the stipulations of clause No. 2 of General Conditions of Contract for his use as per standards and specifications to be approved by the Owner. The Contractor shall obtain all statutory permissions for his temporary establishment and shall pay all necessary statutory fees, taxes, etc. The contractor shall dismantle these temporary establishments and clear the site at his cost after the completion of work.
27. Apart from the work under this Contract, other works connected with the proposed project will be simultaneously going on either departmentally or through other agencies. Each Contractor or Agency shall co-operate with all the others to the fullest extent and shall allow to each other, every facility and co-operation for execution of their works simultaneously and satisfactorily, during the reaction of machinery or execution of any other related works. The Contractor will have to work only at places as directed by the Owner/ Engineer. He may sometimes have to suspend his work partially or totally in the interest of the whole project. In such cases and at such times, he will be informed from time to time and directed by the Owner/ Engineer when to work. He may also be required to dismantle/ shift his construction plant and equipment so as to cause minimum obstruction and inconvenience for erection of machinery and/or any other construction operations. In such cases he shall not be given any compensation on account of reduction or stoppage of labour force or dismantling/ shifting of his construction plant and equipment, etc. It shall however be seen that the Contractor is not put to unnecessary inconvenience.
28. Contractor shall comply with contract Labour (Regulation and Abolishment) Act. The Contractor shall keep the Owner advised of any labour disputes arising on this Contract.
29. All objects of value or antiquity found on site during excavation or otherwise shall remain the property of the Owner, and any such finding shall immediately be reported to the Owner.
30. If the Owner gives permission for night work if requested by the Contractor, such night work shall not entitle the Contractor to any increase in rates. Where night work is in progress, any excavated areas shall be barricaded and shall be provided with red lights and shall take all such other necessary precautions etc. and also all other work areas shall be well lighted to prevent accidental falls, etc.
31. Should work be suspended by reason of rain, strike, lockouts or any other cause, the Contractor shall take all precautions necessary for the protection of works and at his own expense shall make good, to the Owner's satisfaction, any damage arising from any of these causes.
32. All extra items shall be executed, only after written approval of the rate analysis from Owner has been obtained and shall be derived as per Clause 50(IX)(b) of General Conditions of Contract.
33. The Contractor shall submit mix design for concrete at his own cost well before commencement of concreting programme, based on material available at site/ locally, for review and acceptance by the Engineer. The Contractor shall have requisite laboratory at site for carrying out such tests and shall also comply with Clause 38 of General Conditions of Contract with regard to testing.



34. Diesel Mixer and Petrol Vibrator should be used for concreting whenever electricity is not available.
35. Individual PF and ESIC number is essential for participating in tender.
36. Steel brand for structural steel only integrated steel - Jindal , SAIL , TATA
37. Reinforcement steel – only integrated steel - TMT 500 FE -TATA , Arceller mittal , SAIL
38. RMC can use - no extra charge will be paid for that .

**SECTION - 5**

**GENERAL CONDITIONS**

**OF CONTRACT**

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## SECTION – 5

## GENERAL CONDITIONS OF CONTRACT

## 1. DEFINITION OF TERMS.

These contract documents as herein defined where the context so admits, the following words and expressions will have the following meanings :

- a) The “Owner”/ “Client” means SATPUR BRANCH -BANK OF MAHARASHTRA LTD. for SATPUR BRANCH -BANK OF MAHARASHTRA LTD.India or their successors or assigns.
- b) The Consulting engineer / Consultant means - **Tare and Associates** ,  
14, 1<sup>st</sup> Floor ,above Hotel pathik , Shalimar, Nashik 422 001, Maharashtra  
Tel. No. 0253 – 2502727. Mob - 9823082027
- c) The ‘Engineer-in-charge’ / ‘Engineer’ shall mean the Site Manger, the person designated as such by tare and associates / and shall include those who are expressly authorized by Tare and associates / M& M to act for and on its behalf for completion of this contract.
- d) The ‘Design Engineer’ shall mean the person in charge of this project for structural designs / specifications designated by the Engineering Consultant or his successor or his authorized nominee.
- e) The ‘Work’ shall mean the works to be executed in accordance with the contract or part thereof as the case may be and shall include extra, additional, altered or substituted works as required for purpose of the contract.
- f) The ‘Permanent Work’ means and includes works which will be incorporated in and form a part of the work to be handed over to the Owner by the Contractor on completion of the contract.
- g) The ‘Site’ means the areas on which the permanent works are to be executed or carried out and any other places provided by the Owner for purpose of the contract.
- h) ‘The Contractor’ means the person or the persons, firm or company whose tender has been accepted by the Owner and includes the Contractor’s legal representative or his successors and permitted assignee.
- i) The ‘contract Document’ means collectively the Tender Document, Designs, Drawings, Specifications, agreed variations, if any & any such other documents constituting the tender and acceptance thereof.
- j) The ‘Construction Equipment’ means all tools / tackles, machinery and equipment of whatsoever nature for the use or for the execution, completion, operation or maintenance of the work unless intended to form part of the part of the permanent work.
- k) The ‘Sub-Contractor’ means any person or firm or company (other than the Contractor) to whom any part of the work has been entrusted by the Contractor, with the prior written consent of the Engineer-in-charge and the legal representatives, successors and permitted assignee of such person, firm or company.
- i) The ‘contract’ shall mean the Agreement and subsequent additions/ revisions between the Owner and the Contractor for the execution of the works including all contract documents therein.
- m) Estimated contract value / Total contract value shall mean the amount referred to in the agreement.
- n) Final Contract value shall mean the amount of the final bill as certified by the Engineer-In-Charge.
- o) The ‘Specification’ shall mean the various technical specifications attached and referred to in the tender documents. It shall also include the latest editions, versions, including all addenda/ corrigenda or relevant Indian Standard Specifications published before entering into contract.
- p) The ‘Drawings’ shall include maps, plans and tracings or prints thereof with modifications approved in writing by the Engineer-in-charge and such other drawings as may, from time to time, be furnished or approved in writing by the Engineer-in-Charge / Project Manger.

- q) The 'Tender' / 'Bid' means the 'tender' / 'bid' submitted by the Contractor for acceptance by the Owner.
- r) The 'Alteration Order' means an order given in writing by the Engineer-in-charge to effect additions to or deletion from and alterations in the works.
- s) The 'Completion Certificate' shall mean the certificate to be issued by the Engineer-in-charge when the works have been completed in all respects to his entire satisfaction.
- t) The 'Final Certificate' in relation to a work means the certificate issued by the Engineer-in-Charge after the period of defects liability is over.
- u) The 'Period of Liability' in relation to a work means the specified period from the date of issue of completion certificate up to the date of issue of final certificate during which the Contractor stands responsible for rectifying all defects that may appear in the works.

## **2 GENERAL INFORMATION.**

### **2.1 Location of Site and Accessibility**

The subject site is located at **for SATPUR BRANCH -BANK OF MAHARASHTRA LTD.**. The interring tendered should inspect the site and make himself familiar with site conditions and available communication facilities. He should also familiarize himself with line, levels or land & topography, underground drains, soil conditions, etc.

### **2.2 Scope of work**

The scope of work is defined under 'Scope of Work' given separately along with these documents. The Contractor shall provide all necessary materials, equipment, labour etc. for the satisfactory execution and maintenance of the work till completion unless otherwise specifically mentioned in these tender documents. All materials that go with the work (along with source & manufacturer etc. as the case may be ) shall be approved by Engineer-in-charge prior to its procurement and use.

### **2.3 Water and Power Supply**

Water and electricity required for the construction purposes shall be provided at One Point by the Client.

### **2.4 Land for Contractor's Field Office, Godown and Workshop.**

The owner will at his own discretion and convenience and for the duration of the execution of the work make available near the site, land for construction of Contractor's temporary field office & laboratory, temporary office of sufficient area for use of the project consultant's site staff, godown, workshops and assembly yard as may be required for the execution of the contract. The areas for all such temporary structures should be so selected that it does not foul wit any areas of the permanent work. The Contractor to submit a schematic drawing showing the proposed locations for above structures in comparison with all the permanent work and get the same approved from the Engineer-in-charge before proceeding with the construction of these structures. The contractor shall at his own cost construct all these temporary structures and provide suitable water supply and sanitary arrangements approved by, the Engineer-in-Charge. On completion of the works undertaken by the Contractor, he shall remove all temporary works erected by him and have the site cleaned as directed by Engineer-In-Charge. If the Contractor shall fail to comply with these requirements, the Engineer-In-Charge at the expense of the Contractor shall remove such surplus and rubbish/ debris material and dispose off the same as he deems fit and get the site cleared as aforesaid and the Contractor shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such surplus materials disposed off as aforesaid. The owner reserves the right to ask the Contractor, anytime during the pendency of the contract to vacate the land by giving seven days notice on security reasons or on material interest or otherwise.

## **3. SUBMISSION OF TENDER**

- 3.1 Tenders must be submitted in original and one copy without making any additions, alterations and as per details given in other clauses given hereunder the requisite details shall be filled in by the Contractor in the tender document the rates shall be filled in the schedule given in this tender document. Reservations, if any, regarding the tender conditions and schedule of rates should be clearly brought out in a separate letter.
- 3.2 Addenda/ Corrigenda to these tender documents, if issued, must be signed and submitted along with the tender document. The tender should write clearly the revised quantities in schedule of rates offender document and should price the work based on revised quantities in schedule of rates offender document and should price the work based on revised quantities when amendments for quantities are issued in addends.
- 3.3 Covering letter in prescribed format as per the “Proforma of Bidders covering letter for submitting the tender” as included in the tender documents along with its enclosures accompanying the tender document and all further correspondence shall be submitted in duplicate.

#### **4. DOCUMENTS**

- 4.1 The tender as submitted, will consist of the following :
- i) Complete set of tender documents as sold duly filled in and signed by the tenderer as prescribed in different clauses of the tender documents.
  - ii) Earnest money in the manner specified in clause No. 6 here of.
  - iii) Details of work done by the Contractor of similar types and magnitude carried out by the tender during a period of 3 years preceding the date of floating of this tender.
  - iv) Income tax and Sales tax clearance certificates for three preceding years.
  - v) Power of Attorney/ Partnership Deed.
  - vi) Proposed Construction Schedule.
- 4.2 All pages to be initialed by the tenderer as a confirmation of having read & got acquainted with the tender documents.

**All signatures in tender documents shall be dated as well as all the pages of all sections offender documents shall be initialed at THE LOWER RIGHT HAND CORNER and signed wherever required in the tender papers by the tenderer or by a person holding power of attorney authorizing him to sign on behalf of the tender before submission offender.**

#### **4.3 Rates to be in Figures and Words**

The tender should quote in English, both in figures as well as in words, the rates and amounts tendered by him in the schedule of rates for each item and in such a way that alteration is not possible. In case the quoted rates in figures and words does not match each other then the lowest rates of the two will be considered as “valid, the amount for each item should be worked out and entered and requisite total given of all items both in figures and words. The tendered amount for the work shall be entered in the tender and duly signed by the tender. In case of tender being signed by representative of Partners, authorization of person for signing on behalf of Partners should be attached.

#### **4.4 Correction and Erasures**

All corrections and alterations in the entries offender paper will be signed in full by the tender with date. No erasures or overwriting are permissible.

#### **4.5 Signature of Tenders**

The tender shall contain the details of name/s, residential addresses and place of business of the person or persons responding to the tender and shall be signed by tenderer with his usual signature. Partnership firms shall furnish the full names of all the partners in the tender. It should be signed in the partnership’s name by all the partners or by duly authorized representative followed by the name and designation of the person signing. Tender by a corporation shall be signed by an authorized

representative and a power of attorney in that behalf shall accompany the tender. A copy of the constitution of the firm and names of the firm and names of all partners shall be furnished.

#### **4.6 Details of Experience.**

The tender should enclose documents to support his claim that he has previous experience in having successfully completed in the recent past, works of similar nature, together with the names of Owners, copies of W.O.s, names of Consultants and location of sites and values of contracts etc.

#### **5. TRANSFER OF TENDER DOCUMENTS**

Transfer of tender documents purchased by one intending tender to another is not permissible under any circumstances and any such attempt will render the tender void.

#### **6. EARNEST MONEY**

The intending tender shall along with tender deposit with SATPUR BRANCH -BANK OF MAHARASHTRA Limited, as Earnest Money, a sum as set out in clause No. 1.0 of special conditions as a guarantee of good faith, which amount shall be forfeited as liquidated damages in the event of any evasive refusal or delay in signing the contract within stipulated time of signing of agreement as mentioned in the tender. The deposits of the unsuccessful tenders will be returned without interest, immediately after a decision is taken regarding the award of the contract. The earnest money of the successful tender will be adjusted towards security deposit. A tender not accompanied by earnest money deposit will not be considered and rejected forthwith.

#### **7. VALIDITY** As set out in clause No. 20.0 of special conditions.

#### **8. ADDENDA/ CORRIGENDA**

Addenda/ Corrigenda to the tender documents may be issued to effect modifications in the design or contract terms. All addenda/ corrigenda issued shall become part of tender documents.

#### **9. RIGHT OF OWNER TO ACCEPT OR REJECT TENDER**

The right to accept or reject the tender will rest entirely with the Owner. The Owner, however, does not bind himself to accept the lowest tender, and reserves to himself the authority to reject any or all the tenders received without assigning any reason whatsoever. The whole work may be split up between two or more Contractors or accepted in part and not entirely if considered expedient and deemed fit by the Owner under the circumstances prevailing at the time of acceptance of the tender. No exception to this clause shall be entertained.

#### **10. SECURITY DEPOSIT**

The person/ persons whose tender may be accepted (hereinafter called the Contractor) shall within seven days of the receipt by him of the notification of the acceptance of the tender, shall remit the security deposit to SATPUR BRANCH -BANK OF MAHARASHTRA Limited, in the manner stipulated in clause No. 17 of General Conditions of Contract.

#### **11. TIME SCHEDULE**

The time allowed for carrying out the job is as shown in this document. This shall be signed and submitted along with the tender. Requests for revision for construction time after tenders are opened will not be received for consideration.

#### **12. COLLECTION OF DATA IS TENDERERS RESPONSIBILITY**

The tenderer shall visit the site and acquaint him self fully of the site and no claims whatsoever will be entertained on the plea of ignorance or difficulties involved in execution of work or transportation of materials.

#### **13. CO-ORDINATION OF WORK**

The Engineer-in-Charge shall co-Ordinate the works of various agencies engaged at site to ensure minimum disruption of work carried out by different agencies. It must be the responsibility of the



Contractor to plan and executed the work strictly in accordance with site instructions to avoid hindrance to the work being executed by all other agencies.

#### **14. INTERPRETATION OF CONTRACT DOCUMENT**

- 14.1 Except if and to the extent otherwise provided by the contract, the provisions of the general conditions of contract and special conditions shall prevail over those of any other documents forming the contract are to be taken as mutually explanatory and should there be any discrepancy, in-consistency, error or omission in the contract, the matter may be referred to Engineer-in-Charge who shall give his decision and issue to the Contractor instructions directing in what manner the work is to be carried out. The decision of the Engineer-in-Charge shall be final and conclusive and the Contractor shall carry out work in accordance with this decision.
- 14.2 Works shown upon the drawing but not mentioned in the specifications or described in the specifications without being shown on the drawings shall nevertheless be held to be included in the same manner as if they had been specifically shown upon the drawings and described in the specifications.

#### **15. MATERIALS AND WORKMANSHIP**

The materials, design and workmanship shall satisfy the latest revisions of relevant Indian Standards, the job specifications contained herein and codes referred to. Where the job specifications stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied. In case, relevant Indian standards are not available, it shall satisfy the equivalent British or American standards.

#### **16. CONTRACTOR TO OBTAIN HIS OWN INFORMATION.**

The Contractor in fixing his rates shall for all purposes whosoever be deemed to have himself independently obtained all necessary information for the purposes of preparing this tender. The correctness of the details given in the tender document to help the Contractor to submit the tender is not guaranteed.

The Contractor shall be deemed to have examined the Contract Documents, to have generally obtained his own information in all matters whatsoever that might affect the carrying out the works at the scheduled rates and to have satisfied himself to the sufficiency of his offer. Any error in description of quantities or omissions therefore shall not vitiate the contract or release the Contractor from executing the work comprised in the contract according to drawings and specifications at the scheduled rates. He is deemed to have known the scope, nature and labour involved etc. and as to his involvement for all work he has to complete in accordance with the contract documents whatever be the defects, omissions or errors that might have remained inadvertently in the tender documents and deemed to have visited surroundings, to have fully satisfied himself to the nature of all existing structures, if any and also as to the nature and conditions of the railways, roads, bridges and culverts, all the means of transport and communications, whether by land, water or air and as to possible interruptions thereto and the access to and egress from the site, to have made enquiries, examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other materials, the sites for disposal of surplus materials, the available accommodation as to whatever required, depots and such other buildings as may be necessary for executing and satisfactorily completing the works, to have made local independent enquiries as to the sub-soil, water and variations thereof, storms, prevailing winds, climatic conditions, all other similar matters that may affect these works. He is deemed to have acquainted himself as to his liability for payment of Government taxes, customs duty, other charges and other statutory rules and regulations governing work at site and employment of labour in the vicinity.

Any neglect or failure on the part of the Contractor in obtaining necessary and reliable information upon the foregoing or any other matters affecting the contract shall not relieve him from any risks or liabilities or the entire responsibility of completion of the works at the scheduled rates and time in strict accordance with the contract documents.

No verbal agreement or inference from conversation with any officer or employee of the Owner either before or after the execution of the contract agreement shall in any way affect or modify any of the terms of obligations herein contained.

#### **17. SECURITY DEPOSIT**

- 17.1 If the Contractor/ Sub-Contractor or their employees shall break, deface or destroy any property belonging to the Owner or others during the execution of the contract, the same shall be made good by other agencies and the Owner will recover expenses from the Contractor (for which the certificate of the Engineer-in-Charge shall be final). These expenses shall be recovered from the security deposit if recovery from other sources is not possible.
- 17.2 All compensation or other sums of money, payable by the Contractor to the Owner under terms of this contract may be deducted from or paid by the sale of a sufficient part of his security deposit or from any sums which may be due or may become due from the owner to the Contractor on any account whatsoever and in the event of his security deposit being reduced by reasons of any such deductions or sale as aforesaid, the Contractor shall within ten days thereafter make good in cash or bank drafts endorsed as aforesaid any sum or sums which may have been deducted from or realized by sale of his security deposit, or any part thereof, no interest shall be payable on the sum deposited as security deposit.
- 17.3 The security deposit shall be held by SATPUR BRANCH -BANK OF MAHARASHTRA Limited as security for the due performance of the Contractor's obligations under the contract.
- 17.4 The security deposit shall be refunded to Contractor as set out in Clause No. 3 of Special Conditions of Contract.
- 17.5 Security deposit will be utilized if the contractor fails to attend the rectification job during defect liability period.

**18. RETENTION MONEY**

The retention money will be released to the Contractor after the expiry of defects liability period (As per clause No. 49 of General Conditions of Contract). The retention money will not bear any interest.

**19. TIME OF PERFORMANCE**

The work covered by this contract shall be commenced immediately after the receipt of the letter of acceptance of tender and be completed in stages on or before the date mentioned in the time schedule of completion of work. The contractor should bear in mind that TIME IS THE ESSENCE of this agreement. Request for revision of construction time after tenders are opened will not receive any consideration from the Owner.

**20. FORCE MAJEURE**

Any delays in or failure of the performance of either party hereto shall not constitute default hereunder or give rise to claims for damages, if any, to the extent such delays or failure of performance is caused by occurrences such as Acts of God or the public enemy, expropriation or confiscation of facilities by government authorities, compliance with any order or request of any government authorities acts of war, rebellion or sabotage or fires, floods, explosions, riots or illegal strikes. The Contractor shall keep records of the circumstances referred to above and bring these to the notice of Engineer-in-Charge in writing immediately on such occurrences.

**21. LIQUIDATED DAMAGES/ BONUS**

**21.1 LIQUIDATED DAMAGES**

The time allowed for carrying out the work as entered in the contract, shall be strictly observed by the Contractor. The work shall throughout the stipulated period of the contract be proceeded with all the diligence (time being deemed to be the essence of the contract), and the Contractor shall pay to the Owner as and by way of liquidated damages as set out in Clause No. 15 of Special Conditions of Contract for every week that the work may remain incomplete as per the time schedule, subject to a maximum compensation of 5% (Five percent) of the contract value after which period action will be taken by the Engineer-In-Charge under provisions of the contract.

**21.2 BONUS**

As set out in Clause No. 16 of Special Conditions of Contract.

**22. FORFEITURE OF SECURITY DEPOSIT : (NOT APPLICABLE)**

Whenever any claim against the Contractor for the payment of a sum of money arises out of or under the contract, the Owner shall be entitled to recover such sum by appropriating in part or whole of the security deposit of the Contractor. In case, the security deposit is insufficient then the balance or the total sum recoverable, as the case may be shall be deducted from any sum then due to which at any time thereafter may become due to the Contractor. The Contractor shall pay to the Owner on demand any balance remaining due.

**23. ACTION WHEN WHOLE OF SECURITY DEPOSIT IS FORFEITED :**

- a) To rescind the contract (for which Owner's written rescission notice to the Contractor shall be conclusive evidence) in which case the security deposit of the Contractor shall stand forfeited and be absolutely at the disposal of the Owner without prejudice to the rights of the Owner to claim damages from the Contractor.
- b) To employ and pay the labour and to supply materials to carry out the work or any part of the work, debiting Contractor with the cost of labour, cost of tools and plants and equipment charges, the cost of the materials for which a certificate of the Engineer-in-Charge shall be final and conclusive against the contract and 10% of the costs as above to cover all departmental charges, then crediting him with the value of the work done in all respects in the same manner and at the same rates as if it had been carried out by the Contractor under the terms of his contract. The certificate of Engineer-in-Charge as to the value of the work done shall be final and conclusive against the contract.
- c) To measure up the work of the Contractor and to take such part thereof as shall be un-executed out of his scope to give it to another Contractor to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original Contractor, if the whole work had been executed by him (of the amount of which excess, the certificate in writing of the Engineer-in-Charge shall be final and Conclusive) shall be borne and paid by the original Contractor and may be deducted from any money due to him by the Owner under the contract or otherwise from his security deposit or from the proceeds of sale thereof, or a sufficient part thereof.

**In the event of any of the above course of actions being adopted by the Owner, the Contractor, shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any agreements or made any advances on account of or with a view to the execution of the work of the performance of the contract. In case the contract shall be rescinded under the provision aforesaid the Contractor shall not be entitled to recover or be paid any sum for any work actually performed under this contract unless the Engineer-in-charge will certify in writing the performance of such work, and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.**

**24. NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORK**

If at any time after the commencement of the work, the Owner shall for any reason whatsoever not require the whole or part thereof as specified in the tender to be carried out, the Engineer-in-charge shall give notice in writing of the fact to the Contractor, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full, but which he did not having been carried out; neither shall have any claim for compensation by reason of any alterations having been made in the original specifications

drawings, design and instructions which shall involve any curtailment of the work as originally contemplated.

## 25. SUB-LETTING OF WORK

- i) No part of the contract nor any share of interest thereof shall in any manner or degree be transferred, assigned, sublet by the contractor directly or indirectly to any firm or corporation whatsoever except as provided for in the succeeding sub-clause without the consent in writing of the Owner.
- ii) **Sub-Contracts for Works, etc.**  
For execution of any part of the work at site the Owner may give his written consent/ approval for sub-contracting such part of the work for which the main Contractor desires to enter into provided the main Contractor submits such individual sub-contract to the Engineer-in-Charge before being finalized for his approval.
- iii) **Contractor's liability not limited by Sub-Contractors**  
Notwithstanding any subletting with such approval as aforesaid and notwithstanding that the Engineer-in-Charge shall have received copies of any sub-contracts, the Contractor shall be and shall remain solely responsible for the quality and proper and expeditious execution of the works and the performance of all the conditions of the contract in all respects and in such subletting or sub-contracting had not taken place and as if such work has been done directly by the Contractor.
- iv) **Owner may Terminate Sub-Contracts.**  
If any sub-Contractor engaged upon the works at the site executes any work which in the opinion of the Engineer-in-Charge is not in accordance with the contract documents, the Owner may write notice to the Contract asking him to terminate such sub-contract and the Contractor upon the receipt of such notice shall terminate such sub-contract and the latter shall forthwith leave the works, failing which the Owner shall have the right to remove such sub-Contractors from the site as deemed fit by them.
- v) **No remedy for Action under this Clause :**  
No action taken by the Owner under this Clause shall relieve the Contractor of any of his liabilities under the contract or give rise to any right to compensation, extension of time or otherwise.

## 26. RIGHTS OF VARIOUS INTERESTS

The owner reserves the right to distribute the work between more than one Contractor. The Contractor shall co-operate with the Owners and afford other Contractor reasonable opportunity for access of the works, for the carriage and storage of materials and execution of their works.

## 27. RIGHT OF OWNER TO DETERMINE / TERMINATE CONTRACT

- i) Owner shall, at any time, be entitled to determine and terminate the contract, if in the opinion of the Owner the cessation of the work becomes necessary for any cause whatsoever, in which case the cost of approved materials at the site as verified and approved by Engineer-in-Charge and of the value of the work done to date by the Contractor shall be paid for in full at the rates specified in the contract. A notice in writing from the Owner to the Contract of such determination and termination and the reason, thereof shall be conclusive proof of the fact that the contract has been so determined and terminated by the Owner.
- ii) Should the contract be determined under sub-clause (i) of this clause and the Contractor claims payments of compensation for expenditure incurred by him in the expectation of completing the whole of the work, the Owner shall consider and admit such claim as are deemed fair and reasonable and are supported by vouchers to the satisfaction of the Engineer-in-Charge. The Owner's decision on the necessity and propriety of any such expenditure shall be final and conclusive and binding on the Contractor.

## 28. DRAWINGS, DESIGNS ETC. PROPERTY OF OWNER

28.1 All drawings, blue prints, tracings, reproducible, models, plans, specification and copies thereof, furnished by the Owner as well as drawings, tracings, reproducible, plans, specifications, design calculation, etc. prepared by the Contractor for the purposes of execution of works covered in or connected with the contract shall be the property of the Owner and shall not be used for any other work but are to be delivered to the Owner on completion of the contract.

28.2 Where so desired by Engineer-in-Charge, the Contractor agrees to respect the secrecy of any document, drawing, etc. issued to him for the execution of the contract, and restrict access to such documents, drawings, etc. to the maximum and further the Contractor agrees to maintain an individual SECRECY having access to such documents, drawings, etc. In any event the Contractor shall not issue drawings and documents to any other agency or individual without the written approval of Engineer-in-charge.

## **29. LIENS**

### **29.1 Non Waiver of Defaults**

Any failure by the Owner or Contractor at any time, or from time to time to enforce or require the strict keeping and performance of any of the terms or conditions of this agreement, or to exercise a right hereunder, shall not constitute a waiver of such terms, conditions, or rights, and shall not affect or impair the same or the right of the Owner or Contractor, as the case may be, at any time to avail themselves of the same.

## **30. EXECUTION OF WORKS**

30.1 All the Works shall be executed in strict conformity with the provisions of the contract documents and with such explanatory detailed drawings, specifications and instructions as may be furnished from time to time to the Contractor by the Engineer-in-Charge whether mentioned in the contract or not. The Contractor shall be responsible for ensuring that the works throughout are executed in the most substantial, proper and workmanlike manner, with the quality of material and workmanship in strict accordance with the specifications and to the entire satisfaction of the Engineer-in-charge.

30.2 Wherever it is mentioned in the specifications that the Contractor shall perform certain work or provide certain facilities/ materials, it is understood that the Contractor shall do so at his cost.

30.3 The materials, design and workmanship shall satisfy that latest revisions of relevant Indian standards and any other as specified, the job specifications contained herein and codes referred to, where the job specifications stipulate requirements in addition to those contained in the standards & codes and specifications, these additional requirements shall also be satisfied. In case relevant Indian standards are not available it shall satisfy the equivalent British or American standards.

## **31. WORK IN MONSOON AND DEWATERING**

31.1 The companion of the work may entail working in the monsoon also. The Contractor must maintain a minimum labour force as may be required for the job/ and plan and execute the construction and erection according to the prescribed I schedule. No extra rate will be considered for such work in monsoon.

31.2 During the monsoon and other period it shall be the responsibility of the Contractor to keep the construction work site free from water logging at his own cost.

## **32. WORK ON SUNDAYS, HOLIDAYS & AFTER DUSK TIME**

Under unavoidable circumstance or as per requirements of specific site conditions if it becomes necessary to carry out work on Sundays, holidays or after dusk time the Contractor will approach the Engineer-in-Charge or his representative normally two days in advance and obtain necessary permission in writing. The Contractor to make all the necessary arrangements for work to proceed in workmanlike manner solely at his risk and cost during the aforesaid circumstance.

## **33. GENERAL CONDITIONS FOR CONSTRUCTION AND ERECTION WORK**

33.1 The Contractor shall submit to the Owner reports at regular intervals regarding the state and progress of work. The details and proforma of the report will mutually be agreed after the award contract.

- 33.2 For filling material Contractor should identify the source of the quarry and after conducting the necessary testing of the materials recommended for the fill material must obtain the necessary permissions from the concerned local authorities for quarrying activities by making arrangements for paying the royalties and produce the royalty certificate to the Engineer-in-Charge. Any fill material reaching the site from unauthorized quarries will be rejected.
- 33.3 Also in case of disposal of surplus excavated earth outside the territories of the site necessary permission from the concerned local authorities should be obtained in advance by the Contractor for allowing him to dispose off such- excavated materials.

#### **34. DRAWING TO BE SUPPLIED BY THE OWNER**

- 34.1 Where drawings are attached with tender, these shall be for the general guidance of the Contractor to enable him to visualize the types of work contemplated and scope of work involved. The Contractor will be deemed to have studied the drawings and acquainted himself about the work involved.
- 34.2 Detailed working drawings on the basis of which actual execution of the work is to proceed will be furnished in duplicate from time to time during the progress of the work. The Contractor shall be deemed to have gone through the drawings, supplied to him thoroughly and carefully and in conjunction with all other connected drawings and bring to the notice of the Engineer-in-charge discrepancies, if any, therein before actually carrying out the work.
- 34.3 Copies in good and readable condition of all detailed working drawings relating to the works shall be kept at the Contractor's office on the site and shall be made available to the Engineer-in-Charge at any time during the contract. The drawings and other documents issued by the Owner shall be returned to the Owner on completion of the works. Reference is also invited to Clauses 28.1 and 28.2 above regarding drawings and other documents.

#### **35. DRAWINGS TO BE SUPPLIED BY THE CONTRACTOR**

- i) Bar-bending schedule for all RCC items.
- ii) "As-built-Drawings" of all structures etc : After completion of the Project the Contractor shall mark as approved by the Engineer-in-Charge, all deviations on two sets of prints and submit the same to the Design Office for incorporation of the said deviations in the Original Tracings and in Electronic Files. These drawings duly approved by the Engineer-in-Charge shall necessarily be submitted by the Contractor latest along with his final bills or at an earlier date.

#### **36. SETTING OUT WORKS**

The Engineer-in-charge shall furnish the Contractor with only the four corners of the work site and a level bench mark and the Contractor shall set out the works and shall provide an efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out.

#### **37. RESPONSIBILITY FOR LEVEL AND ALIGNMENT**

The Contractor shall be entirely and exclusively responsible for the horizontal and vertical alignment, the levels and the correctness of every part of work and shall rectify and errors or imperfections herein. Such rectifications shall be carried out by the Contractor, at his own cost, when instructions are issued to that effect by the Engineer-in-charge.

#### **38. MATERIAL TO BE SUPPLIED BY THE CONTRACTOR**

- 38.1 The Contractor shall procure and provide the whole of the materials required for the construction including tools, tackles, construction plant and equipment for the completion and maintenance of the work except the materials which will be issued by Owner and shall make his own arrangement for procuring such materials and for the transport/ storage thereof. The Owner may give necessary-recommendation to the respective authority if so desired by the Contractor but assumes no further responsibility of any nature. The Owner will insist on the procurement of all materials conforming to I.S. or relevant standard and from reputed suppliers. Samples where applicable shall be got approved from the Engineer-in-charge. All equipment makes to be got approved prior to procurement.
- 38.2 All materials procured should meet the specifications given in the tender document. The Engineer-in-charge may, at his discretion, ask for samples and test certificates for any batch of the materials

procured. Before procuring, the Contractor should get the approval of Engineer-in-charge for any material to be used for the works.

- 38.3 Manufacturer's certificates shall be submitted for all materials supplied by the Contractor. If, however, in the opinion of the Engineer-in-charge any tests are required to be conducted on the material supplied by the Contractor, these will be arranged by the Contractor promptly at the laboratories recommended by the OWNER at the cost of the Contractor.

#### **39. DESCRIPANCIES BETWEEN INSTRUCTIONS**

**Should any discrepancy occur between the various instructions furnished to the Contractor, his agents or staff or any doubt arises as to the meaning of any such instructions or should there be any misunderstanding between the Contractor's staff and the Engineer-in-Charge whose decision thereon shall be final and conclusive and no claim for losses alleged to have been caused by such discrepancies between instructions doubts or misunderstanding shall in any event be admissible.**

#### **40. ABNORMAL RATES**

The Contractor is expected to quote rate for each item after careful analysis of cost involved for the performance of the completed item considering all specifications and conditions of contract. This will avoid loss of profit or gain in case of curtailment or change of specification of any item. In case it is noticed that the rates quoted by the tenderer for any item are unusually high or unusually low it will be sufficient cause for the REJECTION OF THE TENDER unless the Owner is convinced about the reasonableness of the rates on scrutiny of the analysis for such rates to be furnished by the tenderer on demand.

#### **41. INSPECTION OF WORKS**

- 41.1 The Engineer-in-Charge will have full power and authority to inspect the works at any time wherever in progress, either in the site or at the Contractor's premises/ workshops wherever situated, premises/ workshops of any person, firm or corporation where materials are being made or are to be supplied, and the Contractor shall afford or procure for the Engineer-in-charge every facility and assistance to carry out such inspection. The Contractor shall have been given to the Contractor, the Contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing be present for the purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they have been given to the contractor himself. The contractor shall give not less than seven days notice in writing to the engineer-in-charge before covering up or otherwise placing beyond reach of inspection and measured. In the event of breach of above the same shall be uncovered at Contractor's expenses for carrying out such measurement or inspection.
- 41.2 No material shall be dispatched from the Contractor's works before obtaining the approval in writing of the Engineer in charge.

The Contractor is to provide at all times, during the progress of the work and the maintenance period, proper means of access with ladders, gangways and scaffoldings, etc. and the necessary attendance to move and adopt as directed for inspection or measurement recording etc. of the works by the Engineer-in-charge.

#### **42. ASSISTANCE TO THE ENGINEER-IN-CHARGE**

The Contractor shall make available to the Engineer-in-charge free of cost all necessary instructions and assistance in checking of setting out of works and in checking of any works made by the Contractor for the purpose of setting out and taken measurements of work.

#### **43. TESTS FOR QUALITY OF WORKS**

All workmanship shall be of the best respective kinds described in the contract documents and in accordance with the instructions of the Engineer-in-charge and shall be subjected from time to time to such tests at Contractor's cost as the Engineer-in-charge may direct at the place of manufacture of fabrication, or on the site, or at all or any such places. The Contractor shall provide assistance, instructions, labour and materials as are normally required for examining. Measuring and testing any workmanship as may be required and selected by the Engineer-in-charge.

**44. SAMPLES**

The Contractor shall furnish to the Engineer-in-charge for approval when ! required, or if required by the specifications, adequate samples of all materials and finished goods to be used in the work. Such samples shall be submitted before the work is commenced and in ample time to permit test and examinations thereof. All materials furnished and applied in actual work shall be fully equal to the approved samples.

**45. ACTION AND COMPENSATION IN CASE OF BAD WORK**

If it shall appear to the Engineer-in-charge that any work has been executed with unsound, imperfect or unskilled workmanship or with materials of any inferior quality or that any materials or articles approved by the contractor for the execution of the work are unsound or of a quality inferior to that contracted for, or otherwise not in accordance with the contract, the Contractor shall on demand in writing from the Engineer-in-charge or his authorized representative specifying the work materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the work to specified standards and provide other proper and suitable materials or articles at his own charge and cost, and in the event of failure to do so within a period to be specified by the Engineer-in-charge in his demand aforesaid, the Contractor shall be liable to pay compensation at the rate of one percent of the estimate cost of the whole work, for every week, limited to a maximum of 10% (Ten Percent Only) of the value of the whole work, while his failure to do so continues, and in the case of any such failure the Engineer-in-charge may on expiry of notice period rectify or remove and re-execute the work or remove and replace with others, the materials or articles complained of as the case may below, at the risk and expense in all respects of the Contractor. The decision of the Engineer-in-Charge as to any question arising under this clause shall be final and conclusive.

**46. SUSPENSION OF WORKS**

- i) Subject to the provisions of sub para (ii) of this clause, the Contractor shall, if ordered in writing by the Engineer-in-Charge or his representative, to temporarily suspend the works or any part thereof, for such period and such time as so ordered, and shall not, after receiving such written order, proceed with the work therein ordered to be suspended until he shall have received a fresh written order to proceed with the work therewith. The Contractor shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of the works aforesaid. An extension of time for completion of the works aforesaid. An extension of time for completion of the works as aforesaid will be granted to the Contractor should he apply for the same, provided that suspension was not consequent to any default or failure on the part of the Contractor.
- ii) In case of suspension of entire work, ordered in writing by Engineer-in-Charge for a period of more than three months, the Contractor shall have the option to terminate the contract.

**47. OWNER MAY DO PART OF WORK**

Upon failure of the Contractor to comply with any instructions given in accordance with the provisions of this contract, the Owners has the alternative right, instead of assuming charge of entire work, to place additional labour force, tools, equipment, materials and resources on such parts of the work, as the Owner may designate or also engage another Contractor to carry out the work. In such cases, the Owner shall deduct from the amount which otherwise becomes due to the Contractor, the cost of such work and materials with ten percent added to cover all departmental charges and should the total amount thereof exceed the amount due to the Contractor, the Contractor shall pay the difference to the Owner.

**48. POSSESSION PRIOR TO COMPLETION**



The Engineer-in-Charge shall have the right to take possession of or use any completed or partially completed work or part of the work. Such possession or use shall not be deemed to be final acceptance of any work completed in accordance with the contract agreement. If such prior possession or used by the Engineer-in-Charge delays the progress of work, equitable adjustment in the time of completion will be made and the contract agreement shall be deemed to be modified accordingly.

#### 49. TWELVE MONTHS PERIOD OF LIABILITY FROM THE DATE OF ISSUE OF COMPLETION CERTIFICATE

49.1 The Contractor shall guarantee the installation/ work for a period of twelve months from the date of issue of completion certificate. Any damage or defect that may arise or lie undiscovered at the time of issue of completion certificates, connected in any way with the equipment or materials supplied by him or his sub-Contractors, or in the workmanship shall be rectified or replaced by the Contractor at his own expense as deemed necessary by the Engineer-in-charge or in default, the Engineer-in-charge may cause the same to be made good by the other Contractor and deduct expenses (of which the certificate of Engineer-in-Charge shall be final) from any sums that may be then, or at any time thereafter become due to the contractor or from his security deposit/ retention money.

49.2 The work will not be considered as complete and taken over by the Owner until all the temporary works, constructed by Contractor are removed and work site cleaned to the satisfaction of the Engineer-in-Charge.

#### 49.3 **Care of Works**

From the commencement to completion of the works, the Contractor shall take full responsibility for the care for all works including all temporary works and in case any damage, loss or injury shall happen to the works or to any part thereof or to any temporary works from any cause whatsoever, shall at his own cost repair and make good the same as that at completion the work shall be in good order and in contract and the Engineer-in-Charge's instructions.

#### 49.4 **Defects Prior to Taking Over**

If at any time, before the work is taken over, the Engineer-in-Charge decides that any work done or material used by the Contractor or any sub-Contractor is defective or not in accordance with the contract or that the works or any portion thereof are defective or do not fulfill the requirements of contract (all such matters being hereinafter called 'Defects' in this clause), and as soon as in reasonable practicable time gives the Contractor notice in writing of the said decisions specifying particulars of the defects alleged to exist or to have occurred, then the Contractor at his own expense and with all speed make good the defects so specified.

In case the Contractor shall fail to do so, the Owner may take at the cost of the Contractor, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure so incurred by the Owner will be recovered from the amount due to the Contractor. The decision of the Engineer-in-Charge with regard to the amount to be recovered from the Contractor will be final and binding on the Contractor.

In case the total of such dues to be recovered from the Contractor exceed the amount due to the Contractor on any account, the Owner reserves the right to take appropriate measures to compensation for the difference of the amount between two.

As soon as the works have been completed in accordance with the contract (except in minor respects that do not affect their use for the purpose for which they are intended and except for rectification thereof provided in clause 49.1 of the general conditions of contract) and have passed the tests on completion, the Engineer-in-Charge shall issue a certificate (hereinafter called COMPLETION CERTIFICATE) in which he shall certify the date on which the works have been so completed and have passed the said tests and the Owner shall be entitled to take over any group or groups, the Engineer-in-charge shall issue a completion certificate which will, however. Be for such group or groups so taken over only.

#### 49.5 **Defects after taking over**

In order that the Contractor could obtain a completion certificate he shall make good, with all possible speed, any defect arising from the defective materials supplied by the Contractor, or workmanship, or any act or omission of the Contractor that may have been noticed, or developed, after the work or group

of works has been taken over. The period allowed for carrying out such work will, be normally one month. If any defect be not remedied within a reasonable time, the Owner may proceed to do the work at the Contractor's risk and expense and deduct from the final bill such amount as may be decided by the Owner.

If by any reason or any default on the part of the Contractor, a completion certificate has not been issued in respect of any portion of the works within one month after the date fixed by the Contractor for the completion of the works, the Owner shall be at liberty to use the works or any portion thereof in respect of which a completion certificate has not been issued. The Contractor shall be afforded reasonable opportunity for completing these works for the issue of completion certificate.

## **50. SCHEDULE OF COSTS AND PAYMENTS**

### **i) Contractor's remuneration**

**The price to be paid by the Owner to Contractor for the whole of the work to be done and the performance for all the obligations undertaken by the Contractor under the contract documents shall be ascertained by the application of the respective schedule of costs, (the inclusive nature of which is more particularly defined by way of application but not of limitation, with the succeeding sub-clauses of this clause) and payment to be made accordingly for the work actually executed and approved by the Engineer-in-Charge. The sum as ascertained shall (excepting only as and to the extent expressly provided herein) constitute the sole and inclusive remuneration of the Contractor under the contract and no further over payment whatsoever shall be or become due or payable to the Contractor under the contract.**

### **ii) Rates to be inclusive**

The prices/ rates quoted by the Contractor shall remain firm till the issue of final certificate and SHALL NOT BE SUBJECT TO ESCALATION. Schedule of costs, items shall be deemed to include and liabilities of every description and all risks of every kind to be taken in description and all risks of every kind to be taken in executing, completing and handing over the work to the Owner by the Contractor. The Contractor shall be deemed to have known the nature, scope, magnitude and the extent of the works and materials required though the contract document may not fully and precisely furnish them. He shall make such provisions in the rates as he may consider necessary to cover the cost of such items of work and materials as may be reasonable and necessary to complete the works. The opinion of the Engineer-in-Charge as to the items of work shall be final and binding on the Contractor although the same may not be shown on the described specifically in contract documents. Generally of this present provision shall not be deemed to cut down or limit in any way, because in certain cases it may and in other cases it may not be expressly stated that the Contractor shall do or perform a work or supply articles or perform services at his own cost or without additional payment or without extra charges or words to the same effect or that it may be stated or not be stated that the same are included in and recovered by the schedule of rates.

### **iii) Rates to Cover Constructional Plant, Materials, Labour, Etc.**

Without in any way limiting the provisions of the preceding sub-clause the item rates shall be deemed to include and cover the cost of all constructional plant, temporary work (except as provided for herein), pumps, materials, labour, insurance, fuel, stores and appliances to be supplied by the Contractor and other matters in connection with each item in the item rates and the execution of the works or any portion thereof furnished, completed in every respect and maintained as shown or described in the contract documents, or may be ordered in writing during the continuance of the contract.

### **iv) Rates to Cover Royalties, Rents and Claims**

The rates shall be deemed to include and cover the cost if any of all royalties and fees for the articles and processes, protected by letters, patent or otherwise incorporated in or used in connection with the works, also all royalties, rents and other payments in connection with obtaining materials, or whatsoever kind for the works and shall include an indemnity to the Owner which the Contractor hereby gives against all actions, proceedings, claims, damages, costs and expenses arising from the incorporation in or use of the works of any such articles, processes or materials. Octroi or other municipal or local board charges if levied on materials, equipment or machineries to be brought to site for use on work shall be borne by the Contractor.

**v) To cover Taxes and Duties**

No exemption or deduction of customs duty, excise duties, sales tax, any port dues, transport charges, stamp duties or State Government or local body or Municipal taxes or duties, taxes or charges (from or of any other body), whatsoever, will be granted or obtained. All of the said expenses shall be deemed to be included in and covered by the item rates except Vat & Service Tax. The Contractor shall also obtain and pay for all permits or another privileges necessary to complete the work.

**vi) Rates to Cover Risks of Delay**

The item rates shall be deemed to include and cover the risk of all possibilities of delay and interference with the Contractor's conduct of work which occur from any cause including orders if the Owner in the exercise of his powers and on account of extension of time granted due to various reasons and for all other possible or probable causes of delay.

**vii) Rates cannot be Altered**

For work under unit rate basis, no alteration will be allowed in the schedule of rates by reason of works or of any part of them being modified, altered, extended, diminished or omitted. The items rates are all inclusive rates which have been fixed by the Contractor and agreed to by the Owner and cannot be altered. For lump-sum contracts, the payment will be made according to the work actually carried out, for which purpose an item-wise schedule of rates shall be furnished, suitable for evaluating the value of work done and preparing running account bills.

**viii) No Escalation to be Considered.**

It is to be clearly understood that the rates payable to the Contractor for executed work are FIXED AND ARE NOT LIABLE FOR CONSIDERATION OF ANY ESCALATION towards any increase in prices of building materials and labour or otherwise etc.

**ix) Rates for Extra Items/ Deviated Items**

**a) Deviated Items**

As the work progresses, according to the site conditions or as per instruction of the Owner if any item of work for which there is no provision in the Bill of Quantities is required to be executed then the rates for such items will be decided on the basis of comparison of the rate analysis of items of similar nature and necessary interpolation and extrapolation for which approval prior to execution of such items will have to be obtained from the Engineer-in-Charge.

**b) Extra Items**

The rates for such items which are altogether different in comparison with the scope of the contract will be decided on the basis of detailed rate analysis with respect to actual landed cost of materials etc. and @ 15% towards overheads and profits.

**51. PROCEDURE OF MEASUREMENT / BILLING OF WORK IN PROGRESS  
Measurements**

All measurements shall be in metric system as specified by I.S. Code of practice unless otherwise specified. All the works in progress will be jointly measured by the representative of the Engineer-in-Charge and the Contractor's authorized agents progressively in accordance with the stipulation of IS: 1200, such 'measurements will get recorded in the measurement book by the Contractor or his authorized representative and signed in token of acceptance by the Engineer-in-Charge or his authorized representative.

For the purpose of taking joint measurements, the Contractor's representative shall be bound to be present whenever required by the Engineer-in-Charge. If, however, he abstains for reasons whatsoever,

the measurements will be taken by the Engineer-in-Charge or his representative ex-party and this will be deemed to be correct and binding on the Contractor.

**52. RUNNING ACCOUNT PAYMENT TO BE REGARDED AS ADVANCES**

All running account payments shall be regarded as payment by way of advance against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed or taken away and reconstructed or re-erected or be considered as an admission of the due performance of the contract or any part thereof, in this respect, or of the accruing of any claim to the Contractor, nor shall it conclude, determine or affect in any of them as to the final settlement and the adjustments of the accounts or otherwise, in any other way very or affect the contract. The final bill shall be submitted by the Contractor within one month of the date of physical completion of the work, otherwise the Engineer-in-Charges' certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on all parties.

**53. COMPLETION CERTIFICATE**

Within one month of completion of the work in all respect, the Contractor shall be furnished with a certificate by the Engineer-in-Charge of such completion, but no certificate shall be given nor shall the work be deemed to have been executed until all scaffolding, surplus materials, debris, set concrete and rubbish is cleaned off the site completely, nor until the work shall have been measured by the Engineer-in-charge whose measurements shall be binding and conclusive. The work with measurements will not be considered complete and taken over by the Owner until all the temporary works constructed are removed and the work site cleaned to the satisfaction of the Engineer-in-Charge.

If the Contractor shall fail to comply with the requirements of this clause on or before the date Contractor shall fail to comply with the requirements of this clause on or before the date fixed for the completion of the work, the Engineer-in-charge may at the expense of the Contractor remove such scaffoldings, surplus materials and rubbish and dispose off the same as he think fit and clean off such dirt as aforesaid except for any sum actually realized by the sale thereof.

**54. FINAL DECISION AND FINAL CERTIFICATE**

Upon expiry of the period of liability subject to the Engineer-in-Charge being satisfied that the works have been duly rectified by the Contractor during monsoon or such period as herein before provided in clause 49.1 and that the Contractor has in all respect duly made up any subsidence and performed all his obligations, under the contract, the Engineer-in-charge shall (without prejudice to the rights of the Owner to retain the provisions of relevant clause hereof) give a certificate herein referred to as the final certificate to that effect and the Contractor shall not be considered to have fulfilled the whole of his obligations under the contract until Final Certificate shall have been given by the Engineer-in-Charge notwithstanding any previews entry upon the work and taking possession, working or using of the same or any part thereof by the Owner.

**55. CERTIFICATE AND PAYMENTS ON EVIDENCE OF COMPLETION**

Except the final certificate, no other certificate or payments against a certificate, or on general account shall be taken to be an admission by the Owner of the due performance of the Contract or any part thereof, of occupancy, or validity of any claim by the Contractor.

**56. TAXES, DUTIES, OCTROI & PROVIDENT FUND COMPENSATIONS ETC.**

The Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all taxes, duties, octrois, etc. now or hereafter imposed, increased, modified and all the sales taxes, octrois, etc. now in force and hereafter increased, imposed or modified from time to time in respect of works and materials and all contributions and taxes for unemployment compensation, insurance and old age pensions or annuities and statutory requirements for provident fund compensations of the Contractor's employees now or hereafter imposed by the Central and State Governmental Authorities which are imposed with respect to or covered by the wages, salaries or other compensations paid to the persons employed by the contractor and the Contractor shall be responsible for the compliance with all obligations and restrictions imposed by the Labour Laws or any other law affecting employer-employee relationship and the Contractor further agrees to comply and to secure the compliance of all sub-contractors, with all applicable Center, State, Municipal and Local laws and regulations and requirements of any Center, State or Local Government Agency or Authority, Contractor further agrees

to defend, indemnify and hold harmless the Owner from any liability or penalty which may be imposed by the Central, State or Local Authorities by reason of any violation by Contractor of Authorities by reason of any violation by Contractor or sub-Contractor of such laws, regulations or requirements and also from all claims, suits or proceedings that may be brought against the Owner arising under, growing out of, or by reason of the work provided for by this contract by third parties, or by Central or State Governmental Authorities or any administrative sub-Division thereof.

**57. INSURANCE**

The Contractor shall at his own expense carry out and maintain insurance with a reputable insurance company in accordance with various government acts like EMPLOYEES STATE INSURANCE ACT and WORKMAN'S COMPENSATION ACT and CONTRACTORS ALL RISK POLICY beneficial to the Owner, etc. to the satisfaction of the Owner and indemnity and keep the Owner indemnified against all actions, claims, proceedings, suits that may be made or filed by Contractors, their employees, other heirs and legal representative and against any claims, actions, proceedings, suits filed by the Government, both state or central, in this regards for any breach of current rules, regulations etc. by the Contractor.

**58. DAMAGE TO PROPERTY**

Contractor shall be responsible for making good to the satisfaction of the Owner any loss of or any damage to all structures and properties belonging to the Owner or being executed or procured or being procured by the Owner or of other agencies within the premises of all the works of the Owner, if such loss or damage is due to fault and/or negligence or willful acts or omissions of the Contractor, his employees, agents, representative or sub-Contractor.

**59. ARBITRATION.**

59.1 In case any dispute or difference shall arise between the Owner or the Engineer-In-Charge on his behalf and the Contractor touching or concerning this contract or the construction, meaning, operation or effect thereof or of any clause herein contained or as to the rights, duties or liabilities of the parties hereto respectively or of the Engineer-in-Charge under or by virtue of these presents or otherwise or touching the subject matter of these presents of arising out of or in relation thereto (except as to matters left to the sole discretion of the Engineer-in-Charge) the same shall be referred to the arbitration of a single arbitrator in case the parties can agree upon one, otherwise, to two arbitrators, one a be appointed by each party and an umpire to be appointed by the two arbitrators before entering upon the reference and in either case in accordance with and subject to the provisions of the Indian Arbitration Act 1996 or any statutory modification or re-enactment thereof for the time being in force.

59.2 Work under the Contract shall, if reasonable possible, continue during the arbitration proceedings and no payments due or payable by the Owner shall be with-held on account of such proceedings.

59.3 Arbitration proceedings shall be conducted at Mumbai.

**60. GENERAL**

- i) The rates quoted shall be firm for the complete job in the true sense of the word.
- ii) The rates quoted in the tender shall include all charges for scaffoldings, centering, shuttering, cost of tools, plants and equipment, temporary sheds for storage of materials like cement, making and setting out of works, cleaning of site before commencement and after completion of the work, all taxes duties and levies by local bodies and state or central governments, or any other public bodies except Vat & Service Tax. The rates shall also include all transport of materials, tools, plants, equipment to the site of work and back if necessary and shall be firm and not subjects to variations due to labour conditions or any other conditions whatsoever.
- iii) The Contractor has to make all arrangements for procuring the materials.

- iv) Contractor to make all the necessary arrangements to maintain all the up-to-date records pertaining to the work as deemed fit by the Engineer-in-Charge and should be available for checking and verification as and when desired by him.
- v) The Contractor shall construct, provide and maintain proper grids and bench marks in order that the lines and levels can be checked accurately and with ease as and when necessary.

The Contractor will be allowed to construct temporary sheds for proper storage of all materials, the necessary permissions for which will be obtained by the Contractor from concerned authorities. Contractor shall make his own arrangement at his cost to provide canteen and sufficient sanitary facilities for his employees and labour. Contractor will construct a suitable storage space to store adequate quantity of Cement Bags at site and the storage facilities for cement (i.e. cement godown) should be good approved form the Engineer-in-Charge.

**61. PRECEDENCE ORDER IN CASE OF VARIANCES/ DISCREPANCES :**

For smooth progress of work, the order of priorities as mentioned herein below should be followed in interpreting the true intent of the contract so far as price implications are concerned.

Special conditions shall prevail upon General Conditions for commercial matters whereas for technical matters Site Instructions issued from time to time shall prevail upon Drawings, BOQ, Specifications and finally IS & other statutory stipulations in that descending order.

**62. SAFETY PROCEDURES TO BE FOLLOWED AT SITE :**

The Safety precautions as detailed in Section 6 shall be followed strictly by the Contractor.

**SECTION - 6**

**BANK GUARANTEE FORMAT**

To  
SATPUR BRANCH -BANK OF MAHARASHTRA Pvt..Limited,

**BANK GUARANTEE FOR EMD/SECURITY DEPOSIT**

The Deed of Guarantee made at \_\_\_\_\_ this \_\_\_\_ day of \_\_\_\_\_ 2012, between the Bank \_\_\_\_\_, having one of its branch at \_\_\_\_\_ (herein called the Guarantor and assigns) of the one part and SATPUR BRANCH -BANK OF MAHARASHTRA Pvt. Limited, \_\_\_\_\_ (hereinafter referred to as the Company, which expression shall wherever the context so requires, includes its successors and assigns) of the second part.

**WHEREAS**

The Company has issued a letter of intent dated \_\_\_\_\_ for the proposed \_\_\_\_\_ works in \_\_\_\_\_ for SATPUR BRANCH -BANK OF MAHARASHTRA with \_\_\_\_\_ a registered Company having its registered office at \_\_\_\_\_.

One of the terms of the said agreement is that \_\_\_\_\_ shall provide service as per letter of intent dated \_\_\_\_\_. In order to secure performance of its obligation under the said agreement, \_\_\_\_\_, shall obtain an irrevocable and unconditional Guarantee from a nationalized bank, for value of Rs. \_\_\_\_\_ /- (Rupees \_\_\_\_\_). that the Guarantee shall be continuing Guarantee and in the form acceptable to the Company for the due performance of the terms and conditions of the said agreement.

At the request of \_\_\_\_\_, the bank has agreed to Guarantee the performance of the said agreement in the manner following and the Company has accepted the same.

NOW THIS DEED WITNESSTH that in consideration of the mutual covenants and at the instance of \_\_\_\_\_, the Guarantor hereby unconditionally and irrevocable Guarantee to pay to the Company a sum or sums upto Rs. \_\_\_\_\_/- (Rupees \_\_\_\_\_). Upon the Company's first demand in writing, stating that the sum or sums claimed is / are due to the Company by \_\_\_\_\_ under the said agreement including any modifications thereto. Then and in that event and without prejudice to the other rights of the Company under the said agreement, including any modifications thereto, to take any other action, the Guarantor shall pay to the Company immediately on demand made by the Company in writing, the said amount of Rs. \_\_\_\_\_/- (Rupees \_\_\_\_\_). or any part thereof, notwithstanding any instruction or direction by the Company to the contrary, provided that the aggregate total liability of the Guarantor under this Guarantee shall not exceed the sum of Rs. \_\_\_\_\_/- (Rupees \_\_\_\_\_).

And, it is further agreed and declared that this Guarantee will be continuing Guarantee for any act or omission on the part of \_\_\_\_\_ of negligence, breach of said agreement, including any amendments thereto or extensions thereof, so long as the agreement between the Company and \_\_\_\_\_ remains in the force or till such omission as aforesaid of the said \_\_\_\_\_ by the Company or any indulgence shown or any act of forbearance on the part of the Company will not discharge the Guarantor.

It is further agreed and declared that the right of the Company to recover sum upto Rs. \_\_\_\_\_ /- (Rupees \_\_\_\_\_) from the Guarantor in the manner aforesaid will not be affected or suspended by reason of the fact that any dispute or disputes has or have been raised by \_\_\_\_\_ or any other third party and / or that any dispute



or disputes is or are pending before any officer, tribunal, or court or arbitration. That any demand made by Company on the Guarantor shall be conclusive and binding.

The Guarantor shall not be released from its obligations under these presents by any exercise by the Company or by any other matter / thing whatsoever which under law would, but for this provision, have the effect of relieving the Guarantor. The Guarantee herein contained shall not be determined or affected by liquidation or winding up, dissolution or change in constitution or insolvency of \_\_\_\_\_ but shall in all respects and for all purpose be binding and operative as long as the agreement remains in force or the performance under the agreement has not been fulfilled by \_\_\_\_\_, whichever is latter.

The Guarantee herein shall not be determined or in any way prejudiced by any absorption of the Guarantor with or by any amalgamation thereof with any other bank or concern. In such event the Guarantee shall ensure and be available for any and absorbing or amalgamated bank or concern.

A demand in writing by the Company shall be deemed to have been duly given to the Guarantor by sending the same by registered post with acknowledgement due addressed to the Guarantor at their \_\_\_\_\_ branch office and shall be effectual notwithstanding any change of office and notwithstanding notice thereof to the Company and such demand shall be deemed to be received by the Guarantor at the time when it would normally be received after posting thereof and shall be sufficient if signed by the Company or there advocates duly authorized for the purpose.

The Guarantor also agrees that the Company at its opinion shall be entitled to enforced this Guarantee against the Guarantor as a principal debtor, in the first instance, without proceeding against \_\_\_\_\_.

Any claim or dispute arising under the terms of these documents shall be enforced or settled in the court.

The Guarantor has the power to issue this Guarantee under the memorandum and articles of association and the undersigned has the power to do so under the power of attorney dated \_\_\_\_\_ granted to him by the Guarantor.

Notwithstanding anything herein contained

1. The liability of the Guarantor under this Guarantee shall not exceed Rs. \_\_\_\_\_ /- (Rupees \_\_\_\_\_).
2. This Guarantee shall be valid till \_\_\_\_\_.
3. The Guarantor is liable to pay the entire amount or any part thereof under this Bank Guarantee only if the Company serves upon the Guarantor a written notice, claim or demand on or before \_\_\_\_\_.

IN THE WITNESS WHEREOF, the Guarantor has put his hand and year first herein above writer.

Signed and delivered by:

For and on behalf of the Bank  
(Manager) with seal / stamp and address.



## **SECTION - 7**

**BILL OF QUANTITIES**  
**Attached separately**

**SECTION - 8**  
**SPECIFICATION**

SECTION EIGHTSPECIFICATIONSA.SPECIFICATIONS FOR FABRICATION OF STRUCTURAL STEEL

## 1.0 SCOPE

1.1 This specification covers the general requirements for supply where specified, fabrication and delivery at site of structural steel. Section 7 covers the specific requirements for the project. The two parts are complementary and are to be read together for a correct interpretation of the provisions of this specification.

1.2 This specification also covers design of all connections and substituted members, preparation of all shop fabrication drawings, inspection and shop painting of structures.

## 2.0. APPLICABLE CODES &amp; SPECIFICATIONS

The following specifications, standards and codes are made a part of this specification. All standards, specifications and codes of practices referred to herein shall be the latest editions including all applicable official amendments and revisions.

In case of discrepancy between this specification and other documents referred to herein, this specification shall govern.

## a) Materials

- i) IS : 808 Dimensions for Hot Rolled Steel sections
- ii) IS: 814 Covered Electrodes for Manual Metal Arc Welding of Carbon and Carbon Manganese Steel
- iii) IS: 1161 Steel Tubes for structural purposes
- iv) IS: 1239 Mild steel tubes, tubulars and other Wrought steel fittings Part I - Mild steel tubes  
Part 2 - Mild steel Tubulars and other wrought steel pipe fittings
- v) IS: 1363 Hexagon Head Bolts, Screws and Nuts of product (Parts I to 3) Grade C (Size range M5 to M64)
- vi) IS: 1367 Technical Supply Conditions for Threaded Fasteners (All Parts)
- vii) IS: 1852 Rolling and Cutting Tolerances for Hot Rolled Steel Product
- viii) IS: 1977 Structural Steel (Ordinary Quality)
- xi) IS : 2062 Steel for General Structural Purposes
- ix) IS : 2074 Ready Mixed Paint, Air drying, Red Oxide Zinc Chrome and Priming
- x) IS: 3502 Steel Chequered Plate
- xi) IS : 3757 High Strength Structural Bolts
- xii) IS : 5369 General Requirements for Plain Washers and Lock Washers
- xiii) IS : 5372 Taper Washers for Channels
- xiv) IS : 5374 Taper Washer for I Beams

xvi) IS : 6610 Heavy Washers for Steel Structures

xvii) IS : 8500 Structural Steel-micro alloyed (medium and high strength qualities)

b) Codes Of Practice

- i) IS : 800 Code of Practice for General Construction in Steel
- ii) IS : 801 Code of practice for use of Cold formed light gauge steel structural members in general building construction
- iii) IS : 803 Code of practice for design, fabrication and erection of vertical mild steel cylindrical welded storage tanks
- iv) IS: 806 Code of practice for use of steel tubes in general building construction
- v) IS: 816 Code of Practice for use of Metal Arc Welding for General construction in Mild Steel
- vi) IS: 822 Code of Procedure for Inspection of Welds
- vii) IS: 1182 Recommended Practice for Radiographic examination of Fusion - Welded Butt Joints in Steel Plates
- viii) IS: 1200 Method of Measurement in Building Civil Engineering Works
- ix) IS: 1477 Code of Practice for Painting of (Parts I & 2) Ferrous Metals in Buildings
- x) IS : 2595 Code of Practice for Radiographic Testing
- xi) IS: 3658 Code of Practice for Liquid Penetrant Flaw Detection
- xi) IS : 4000 High strength bolts in Steel Structures - Code of Practice
- xiii) IS: 5334 Code of Practice for Magnetic Particle Flaw Detection of Welds
- xii) IS : 7215 Tolerances for Fabrication of Steel Structures
- xv) IS: 9595 Recommendations for Metal Arc Welding of Carbon and Carbon Manganese Steel

### 3.0 STEEL MATERIALS

Steel materials shall comply with the specifications laid down under clause 2.0 and/or as called for on the design drawings.

All materials used shall be new, unused and free from defects.

Steel conforming to IS: 1977 shall be used only for the following:

FE 310-0(St 32-0) : For general purposes such as door/ window frames, grills, steel gates, handrails, fence posts, tee bars and other non-structural use.

FE 41 0-0(St 42-0) : For structures not subjected to dynamic loading other than wind loads such as: Platform roofs, foot over bridges, building, factory sheds etc.

FE 410-0(St 42-0) : grade steel shall not be used

a) if welding is to be employed for fabrication

b) if site is in severe earthquake zone

c) if plastic theory of design is used

#### 4.0 USE OF STEEL SUPPLIED BY THE PURCHASER

The **VENDOR/CONTRACTOR** shall use steel supplied by the **PURCHASER** judiciously and to the best advantage so as to minimize splicing and wastage

All steel materials remaining after completion of the report, whether in the form of balance pieces or unutilized prime steel, shall be returned to the **PURCHASER's** stores by the **VENDOR/CONTRACTOR** at his own cost. An unaccountable wastage up to a maximum of 1% of the fabricated steel will be allowed. This wastage does not include the balance cut lengths/pieces of steel returned to the **PURCHASER**

#### 5.0 DRAWINGS PREPARED BY THE OWNER

5.1 Design drawings will be furnished to the **VENDOR/CONTRACTOR** and all drawings so furnished shall form a part of this specification. These design drawings prepared by the **ENGINEER** will show all the levels, forces on members where necessary, size and orientation of each member, location/size of openings, to enable the **VENDOR/CONTRACTOR** to prepare drawings for fabrication and erection. It shall be clearly understood that these drawings are not intended to show connection details, thickness of members, cuts, notches, bends and such other details.

5.2 The **ENGINEER** reserves the right to make changes/Revisions to drawings, even after release for preparation of shop drawings, are very likely to be made to reflect additional data/details received and updated requirements. Revisions to drawings and any new drawings made to include additional work by the **VENDOR/CONTRACTOR** shall be considered a part of this specification and contract. The **PURCHASER** shall not entertain any extra claims on this account.

5.3 Where the fabrication drawings are to be furnished by the **ENGINEER**, he will issue to the **VENDOR/CONTRACTOR** the required copies of such drawings in the sequence required for the fabrication of the components in the order they will be required to be erected at site. Such drawings will be issued in such numbers as required for the **VENDOR/CONTRACTOR** to adhere to the project schedule.

5.4 Should the **VENDOR/CONTRACTOR** during the execution of his work, find discrepancies in the information furnished by the **ENGINEER**, he shall refer such discrepancies to the **ENGINEER** before proceeding with such work.

#### 6.0 DRAWINGS PREPARED BY THE VENDOR/CONTRACTOR

6.1 The **VENDOR/CONTRACTOR** shall prepare all fabrication and erection drawings for the entire work. All the drawings for the entire work shall be prepared in metric units. The drawings shall preferably be of one standard size and the details shown there in shall be clear and legible.

6.2 The **VENDOR/CONTRACTOR** shall not commence detailing unless **ENGINEER's** design drawings are officially released for preparation of shop drawings. The **VENDOR/CONTRACTOR** shall be responsible for the correctness of all fabrication drawings. Fabrication drawings shall be revised by the **VENDOR/CONTRACTOR** to reflect all revisions in design drawings as and when such revisions are made by the **ENGINEER**.

6.3 All fabrication drawings shall be submitted to the **ENGINEER** for approval.

6.4 No fabrication drawings will be accepted for **ENGINEER's** approval unless checked and approved by the **VENDOR/CONTRACTOR's** qualified structural engineer and accompanied by an erection plan showing the location of all pieces detailed. The **VENDOR/CONTRACTOR** shall ensure that connections are detailed to obtain ease in erection of structures and in making field connections.

6.5 Fabrication shall be started by the **VENDOR/CONTRACTOR** only after **ENGINEER's** approval of fabrication drawings. Approval by the **ENGINEER** of any of the drawings shall not relieve the **VENDOR/CONTRACTOR** from the responsibility for correctness of engineering & design of connections,

workmanship, fit of parts, details, material, errors or omissions of any and all work shown thereon. The ENGINEER's approval shall constitute approval of the size of members, dimensions and general arrangement but shall not constitute approval of the connections between members and other details.

6.6 The drawings prepared by the VENDOR/CONTRACTOR and all subsequent revisions etc. shall be at the cost of the VENDOR/CONTRACTOR for which no separate payment will be made.

## 7.0 FABRICATION

### 7.1 General

All workmanship and finish shall be of the best quality and shall conform to the best approved method of fabrication. All materials shall be finished straight and shall be machined ground smooth true and square where so specified. All holes and edges shall be free of burrs. Shearing and chipping shall be neatly and accurately done and all portions of work exposed to view shall be neatly finished. Unless otherwise directed/ approved, reference may be made to relevant IS codes for providing standard fabrication tolerance. Material at the shops shall be kept clean and protected from weather.

### 7.2 Connections

7.2.1 Shop/field connections shall be as per approved fabrication drawings.

7.2.2 In case of bolted connections, taper washers or flat washers or spring washers shall be used with bolts as necessary. In case of high strength friction grip bolts, hardened washers be used under the nuts or the bolt heads whichever are turned to tighten the bolts. The length of the bolt shall be such that atleast one thread of the bolt projects beyond the nut, except in case of high strength friction grip bolts where this projection shall be atleast three times the pitch of the thread.

7.2.3 In all cases where bearing is critical, the unthreaded portion of bolt shall bear on the members assembled. A washer of adequate thickness may be provided to exclude the threads from the bearing thickness, if a longer grip bolt has to be used for this purpose.

7.2.4 All connections and splices shall be designed for full strength of members or loads indicated on ENGINEER's design drawings. Column splices shall be designed for the full tensile strength of the minimum cross section at the splice.

7.2.5 All bolts , nuts, washers, electrodes, screws etc. shall be supplied/brought to site 10% in excess of the requirement in each category and size. Rates shall cover the cost of this extra quantity.

7.2.6 All members likely to collect rain water shall have drain holes provided.

### 7.3 Straightening

All materials shall be straight and, if necessary, before being worked shall be straightened and/or flattened by pressure and shall be free from twists. Heating or forging shall not be resorted to without the prior approval of the ENGINEER in writing.

7.4 Cutting, punching, drilling, welding and fabrication tolerances shall be generally as per relevant IS codes.

### Rolling and Forming

Plates, channels, R.S.J. etc., for circular bins, bunkers, hoppers, gantry girders, etc., shall be accurately laid off and rolled or formed to required profile! shape as called for on the drawings. Adjacent sections shall be match-marked to facilitate accurate assembly, welding and erection in the field.

### High Strength Friction Grip Bolting

7.6.1 Inspection after tightening of bolts shall be carried out as stipulated in the appropriate standards depending upon the method of tightening and the type of bolt used.



### 7.7 Welding

7.7.1 Welding procedure shall be submitted to ENGINEER for approval. Welding shall be entrusted to only qualified and experienced welders who shall be periodically tested and graded as per IS 817, IS: 7310 (Part 1) and IS: 7318 (Part 1).

7.7.2 While fabricating plated beams and built up members, all shop splices in each component part shall be made before such component part is welded to other parts of the members. Wherever weld reinforcement interferes with proper fit-up between components to be assembled for welding, these welds shall be ground flush prior to assembly.

7.7.3 Approval of the welding procedure by the ENGINEER shall not relieve the CONTRACTOR of his responsibility for correct and sound welding without undue distortion in the finished structure.

7.7.4 No welding shall be done when the surface of the members is wet nor during periods of high wind.

7.7.5 Each layer of a multiple layer weld except root and surfaces runs may be moderately peened with light blows from a blunt tool. Care shall be exercised to prevent scaling or flaking of weld and base metal from over penning.

7.7.6 No welding shall be done on base metal at a temperature below -5 Deg.C. Base metal shall be preheated to the temperature as per relevant IS codes.

7.7.7 Electrodes other than low-hydrogen electrodes shall not be permitted for thicknesses of 32 mm and above.

#### 7.7.8 Inspection of Welds

All welds shall be inspected for flaws by any of the methods described under clause 8 "Inspection". The choice of the method adopted shall be determined by the PURCHASER/ENGINEER.

7.7.9 The correction of defective welds shall be carried out as directed by the ENGINEER without damaging the parent metal. When a crack in the weld is removed, magnetic particle inspection or any other equally positive means as prescribed by the ENGINEER shall be used to ensure that the whole of the crack and material upto 25 mm beyond each end of the crack has been removed. Cost of all such tests and operations incidental to correction shall be to the VENDOR/CONTRACTOR's account.

### 7.8 Tolerances

The dimensional and weight tolerances for rolled shapes shall be in accordance with IS:1852 for indigenous steel and equivalent applicable codes for imported steel. The tolerances for fabrication of structural steel shall be as per IS:7215.

### 7.9 End Milling

Where compression joints are specified to be designed for bearing, the bearing surfaces shall be milled true and square to ensure proper bearing and alignment.

## 8.0 INSPECTION

8.1.1 The VENDOR/CONTRACTOR shall give due notice to the PURCHASER/ENGINEER in advance of the works getting ready for inspection.

All rejected material shall be promptly removed from the shop and replaced with new material for the PURCHASER's/ENGINEER's approval. Inspection. The fact that certain material has been accepted at the VENDOR/CONTRACTOR's shop shall not invalidate final rejection at site by the PURCHASER/ENGINEER if it fails to conform to the requirements of these specifications, to be in proper condition or has fabrication inaccuracies which prevents proper assembly nor shall it invalidate any claim which the PURCHASER may make because of defective or unsatisfactory materials and/or workmanship.

8.1.2 No materials shall be painted or dispatched to site without inspection and approval by the PURCHASER/ENGINEER unless such inspection is waived in writing by the ENGINEER.

8.1.3 The VENDOR/CONTRACTOR shall provide all the testing and inspection services and facilities for shop work except where otherwise specified.

8.1.4 For fabrication work carried out in the field the same standard of supervision and quality control shall be maintained as in shop fabricated work. Inspection and testing shall be conducted in a manner satisfactory to the ENGINEER.

8.2 Inspection and tests on structural steel members shall be as set forth below:

#### 8.2.1 Material Testing

If mill test reports are not available for any steel materials the same shall be got tested by the VENDOR/CONTRACTOR to the ENGINEER's satisfaction to demonstrate conformity with the relevant specification.

#### Tests on Welds

##### 1 Magnetic Particle Test

Where welds are examined by magnetic particle testing, such testing shall be carried out in accordance with relevant IS codes. If heat treatment is performed, the completed weld shall be examined after the heat treatment. All defects shall be repaired and retested. Magnetic particle tests shall be carried out using alternating current. Direct current may be used with the permission of the ENGINEER.

##### 8.3.2 Liquid Penetrate Inspection

In the case of welds examined by Liquid Penetrate Inspection, such tests shall be carried out in accordance with relevant IS Code. All defects shown shall be repaired and rechecked.

##### 8.3.3 Radiographic Inspection

All full strength butt welds shall be radiographed in accordance with the recommended practice for radiographic testing as per relevant IS code.

#### 8.4 Dimensions, Workmanship & Cleanliness

Members shall be inspected at all stages of fabrication and assembly to verify that dimensions, tolerances, alignment, surface finish and painting are in accordance with the requirements shown in the VENDOR/CONTRACTOR's approved fabrication drawings and the ENGINEER's drawings.

#### 8.5 Test Failure

In the event of failure of any member to satisfy inspection or test requirement, then CONTRACTOR shall notify the ENGINEER or his authorized representative. The VENDOR/CONTRACTOR must obtain permission from the ENGINEER before repair is undertaken. The quality control procedures to be followed to ensure satisfactory repair shall be subject to approval by the ENGINEER.

8.6 The ENGINEER has the right to specify additional testing as he deems necessary, and the additional cost of such testing shall be borne by the PURCHASER, only in case of successful testing.

8.7 The VENDOR/CONTRACTOR shall maintain records of all inspection and testing which shall be made available to the ENGINEER or his authorized representative.

#### 9.0 SHOP MATCHING

For structures like bunkers, tanks, etc. shop assembly is essential. For other steel work, such as columns along with the tie beams/bracings may have to be shop assembled to ensure satisfactory fabrication, obtaining of adequate bearing areas etc. if so desired by the ENGINEER. All these shop assemblies shall be carried out by VENDOR/CONTRACTOR at no extra cost to the PURCHASER.

## 10.0 DRILLING HOLES FOR OTHER WORKS

As a part of this Contract, holes in members required for installing equipment or steel furnished by other manufacturers or other contractors shall be drilled by the VENDOR/CONTRACTOR at no extra cost to the PURCHASER. The information for such extra holes will be supplied by the PURCHASER/ENGINEER.

## 11.0 MARKING OF MEMBERS

11.1 After checking and inspection, all members shall be marked for identification during erection. This mark shall correspond to distinguishing marks on approved erection drawings and shall be legibly painted and stamped on it. The erection mark shall be stamped with a metal dye with figures at least 20 mm high and to such optimum depth as to be clearly visible.

11.2 All erection marks shall be on the outer surface of all sections and near one end, but clear of bolt holes. The marking shall be so stamped that they are easily discernible when sorting out members. The stamped marking shall be encircled boldly by a distinguishable paint to facilitate easy location.

11.3 Erection marks on like pieces shall be in identical locations. Members having lengths of 7.0 m or more shall have the erection mark at both ends.

## 12.0 ERRORS

Any error in shop fabrication which prevents proper assembling and fitting up of parts in the field by moderate use of drift pins or moderate amount of reaming will be classified by the ENGINEER as defective workmanship. In case ENGINEER rejects such material or defective workmanship, the same shall be replaced by the materials and workmanship conforming to the ENGINEER's requirements by VENDOR/CONTRACTOR free of cost at site.

## 13.0 METHOD OF MEASUREMENT

For the purpose of payment, the weight of the actual completed structures shall be calculated from the approved drawings for different items of work. The VENDOR/CONTRACTOR shall submit to the PURCHASER relevant material list containing weight of each item.

No allowances will be permitted for bolts, nuts, washers, studs, screws etc, galvanizing, welding or for rolling margins One tonne for the purpose of payment shall mean ONE METRIC TONNE i.e. 1000 Kg.

13.3 The weight of a member made out of standard rolled section such as beams, channels, angles, etc. shall be based on the standard IS:808 without deductions for holes, notches, bevel cuts, etc. Where a component consists of a cut joist or channels, the full weight of the rolled section shall be considered only if more than half the depth of the original section is used. Otherwise, only half the section unit weight shall be considered for calculation of the weight of the components.

Deductions shall be made in the weight of gussets/plates for cuts and notches of 900 sq. cm. or larger.

13.4 For gussets/plates used in trusses, bracings, columns, beams, etc, the area shall be that of the minimum circumscribing rectangle except as stated in 14.3 above.

13.5 The weight of any built-up members shall be based on the weight of each component.

## **B. SPECIFICATIONS FOR PAINTING OF STRUCTURAL STEEL**

### 1.0 SCOPE

1.1 This specification covers the general requirements for painting structural steel work involving the supply and delivery of all necessary materials, labour, scaffolding, tools and equipment. This document covers the aspects of surface treatment, application of primer paint and finish painting.

## 2.0 APPLICABLE CODES AND SPECIFICATIONS

The following Standard Specifications and Codes of Practice are made a part of this Specification. All standards and codes referred to herein shall be the latest editions including all applicable official amendments and revisions.

In case of discrepancy between this specification and those referred to herein, this specification shall govern.

- i) IS:102 Ready Mixed paint, Brushing, Red Lead, Non-setting, Priming.
- ii) IS:110 Ready Mixed paint, brushing, grey filler for enamels for use over primers.
- iii) IS:117 Ready Mixed paint, Brushing, Finishing, Exterior Semi gloss for general purposes, to Indian Standard colours.
- iii) IS:158 Ready Mixed paint, Brushing, Bituminous, Black, Lead free, Acid, alkali and heat resisting.
- iv) IS:159 Ready Mixed paint, Brushing, Acid resisting.
- v) IS:341 Black Japan, Types A, B and C
- vii) IS:1477 Codes of Practice for painting of ferrous metals in buildings.  
Part I - Pretreatment -  
Part II – Painting
- viii) IS:2074 Ready Mixed paints, Red Oxide Zinc chrome priming.
- vi) IS:2339 Aluminium paint for general purposes, in Dual container
- x) IS:2932 Specification for enamel, synthetic, exterior, type 1,  
(a) undercoating (b) finishing
- vii) IS:2933 Specification for enamel, exterior, type 2, (a) undercoating, (b) finishing
- xii) IS:5905 Sprayed aluminum and zinc coatings on Iron and Steel. xiii) IS:6005 Code of practice for phosphating of Iron and Steel. xiv) IS:9862 Specification for ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water & chlorine resisting.
- xv) IS:13183 Aluminum paint, Heat resistant. xvi) SIS-05-5900 Swedish Standard

## 3.0 SURFACE TREATMENT

3.1 All the surfaces of steel work to be painted shall be thoroughly cleaned of all loose mill scale, rust, grease, dirt and other foreign matter. The type of surface treatment shall be as specified in the respective item of work. The workmanship shall generally conform to the requirements of IS 1477-Part I.

3.2 Oil and grease removal shall be carried out either by solvent cleaning or by using alkali type degreasing agents. To remove grease material the surface shall be cleaned with solvents containing emulsifier. After cleaning, the surface shall be washed with water. When the surface has cement pelts or salts, the cleaning shall be done with strong alkalis. After cleaning, water rinsing and subsequent passivation by dilute chromic acid rinsing shall be carried out to ensure that no traces of alkali is left on the surface. The procedure for cleaning by above mentioned methods shall be as per manufacturers instructions.

3.3 Derusting and descaling of steel shall be carried out either manually, mechanically or chemically.

### 3.3.1 Manual Or Hand Tool Cleaning

Loose mill scale, loose rust and loose paint shall be removed by wire brushing, scrapping, chipping and rubbing with abrasive paper or steel wool. This method shall not be employed when the surface has firmly adhering mill scale. After hand tool cleaning, the surface shall be rubbed with sand paper so as to ensure that no loose material exists and the surfaces shall be dusted off.

### 3.3.2 Mechanical Cleaning

#### 3.3.2.1 Power Tool Cleaning

This shall be carried out by employing power operated wire brushes. Power tool cleaning shall be resorted to only if sand/shot blasting is not possible/permissible and high quality of surface preparation is required.

The surface prior to such cleaning shall be cleaned of dust, grease etc. and heavier layers of rust shall be removed by chipping.

The power tool cleaning shall remove loose mill scale and rust by adopting very thorough scrapping, grinding and machine brushing. After the surfaces are cleaned by compressed air, it shall have a pronounced metallic sheen.

#### 3.3.2.2 Flame Cleaning

Hard mill scale and rust shall be removed through Oxy- acetylene flame. The work shall be carried out by trained workmen to ensure that only mill scale is removed without affecting the parent steel. The work shall be carried out carefully on welded surfaces so that the strength of weld is not affected due to heating.

### 3.3.3 Sand Blasting And Shot Blasting

3.3.3.1 Sand/shot blasting shall be resorted to only after removal of grease, oil and other contaminants. The work shall be carried out by impinging under pressure of air, a jet of sharp sand or granulated steel (steel grits) on to the metal surface. The process shall ensure complete removal of rust and firmly adhering mill scale. Special care shall be taken on weld areas to remove flux and spatter. Blasting shall ensure an even colour of the surface and the surface shall have silver grey colour. Precautions shall be taken when sand or shot blasting of light gauge steel surfaces to ensure that buckling does not occur to continuous impingement of sand or steel shots under high velocity.

3.3.3.2 Sand/shot blasting shall be adopted for structures which are exposed to corrosive conditions for which superior paint protection is to be adopted. The finished surfaces shall conform to the requirements of Sa 2% or Sa 3 as per Swedish Standard SIS-05-5900 as specified in the item of work.

3.3.3.3 As Sandblasting causes dust nuisance necessary clearance shall be obtained by the CONTRACTOR from Competent authorities prior to commencing Sand blasting.

### 3.4 Chemical Cleaning (Pickling)

3.4.1 The cleaning shall be done by pickling in sulphuric, hydrochloric or phosphoric acids. Pickling shall be carried out in accordance with detailed procedure as given in IS 6005.

3.4.2 Washing after pickling shall remove all traces of the acids. All work pieces shall be thoroughly inspected and in particular the inaccessible corners.

## 4.0 MATERIALS

### 4.1 Primer Paint

4.1.1 Anti-corrosive primers shall be either lead based or lead free types. Red lead primer shall conform to IS 102 and red oxide zinc chrome primer shall conform to IS 2074.

#### 4.2 Finish Paint

4.2.1 Synthetic enamel painting for undercoat and finish coat shall conform to IS 2932/IS 2933.

4.2.2 Acid, alkali and heat resistant bituminous paint shall conform to IS 158.

4.2.3 Acid, alkali, water and chlorine resisting bituminous paint shall conform to IS 9862.

4.2.4 Heat resistant aluminium paint shall conform to IS 13183.

4.2.5 Epoxy primer and epoxy paint shall be of the type as specified in the item of work from an approved manufacturer.

4.2.6 Chlorinated rubber based paint shall be of the manufacture as specified or any equivalent approved manufacture.

4.3 All the materials shall be of the best quality from an approved manufacturer. CONTRACTOR shall obtain prior approval of the ENGINEER for the brand of manufacture and the colour/shade prior to procurement for usage in the works.

4.4 Primer and finish paints shall be compatible with each other to avoid cracking and wrinkling. As such it is recommended that the primer and finish paint shall be from the same manufacturer.

4.5 The colour and shade shall conform to IS Standards referred to in Appendix 'D' of IS 1477-Part II. To facilitate choosing the correct shade/number from the alternatives available, CONTRACTOR shall adopt trial painting in small patches in consultation with and as directed by the ENGINEER.

4.6 All paint delivered to the fabrication shop/site shall be ready mixed, in original sealed containers, as packed by the manufacturer. Thinner shall not be permitted for usage unless specifically directed by the ENGINEER.

4.7 Paints shall be stirred thoroughly to keep the pigment in suspension.

4.8 CONTRACTOR shall at his own cost arrange for testing of paints as per relevant Indian standards in standard laboratory whenever OWNER wants the tests to be carried out for each batch of paints. Test results shall be submitted to the OWNER for obtaining approval.

#### 5.0 WORKMANSHIP

5.1 The type and the number of coats of the primer paint and finish paint shall be as specified in the respective items of work.

5.2 Painting shall be carried out only on thoroughly dry surfaces.

5.3 No painting shall be done in frosty/foggy weather or when the humidity is high enough to cause condensation on the surface to be painted. Paint shall not be applied when the temperature of the surface to be painted is at 5°C or lower.

5.4 Primers shall adhere to the surface firmly and offer a key to the subsequent coats.

5.5 The application of paint film shall serve the twin purpose of protecting the steel from corrosion and giving the decorative appearance. A paint which gives the steel adequate protection over a long period together with good appearance shall therefore be adopted.

5.6 Workmanship shall generally conform to requirements specified in IS:1477-Part II.

5.7 It is essential to ensure that immediately after preparation of the surfaces, the first coat of primer paint shall be applied by brushing and working it well to ensure a continuous film without "holidays". After the first coat becomes hard dry a second coat of primer shall be applied by brushing to obtain a film free from holidays.

5.8 Structural steel surfaces shall be given the first coat of primer at shop and the second coat after it is erected in position. Further, any abraded surfaces of the first coat during transport from shop to site and during erection shall be provided with a touch-up coat of the primer.

5.9 The dry film thickness of each coat of primer shall be not less than 25 microns.

5.10 Application of finishing paints shall be carried out within the shortest possible time interval after primer since the primer coats are too thin to give adequate corrosion protection to the steel surface over a long duration.

5.11 Filler coats shall be applied to fill dents and to obtain a smooth finish wherever necessary. Only factory prepared filler suitable for steel work shall be used. Fillers prepared by whiting and linseed oil by craftsmen at site shall never be used as such fillers may be unbalanced and incompatible with primer and finishing coats. Application of filler shall be done with good 'putty knife' and necessary skill. Filler applied shall be just sufficient to fill the depression or unevenness and it shall be restricted to the minimum. It shall be applied in thin layers. In filling depression or unevenness, due as many coats as are necessary may be applied allowing each layer to dry hard. The hardened coat shall be cut down by wet rubbing before the subsequent coat is applied. Where necessary, filler coats shall be applied over the undercoats also.

5.12 Painting shall be carried out either by brushing or by spraying. CONTRACTOR shall procure the appropriate quality of paint for this purpose as recommended by the manufacturer.

5.13 After the second coat of primer is hard dry, the entire surface shall be wet rubbed cutting down to a smooth uniform surface. When the surface becomes dry, the undercoat of paint of optimum thickness shall be applied by brushing/spraying with minimum of brush marks. The coat shall be allowed to hard-dry. The under coat shall then be wet rubbed cutting down to a smooth finish, taking adequate care to ensure that at no place the undercoat is completely removed. The surface shall then be allowed to dry.

5.14 The first finishing coat of paint shall be applied by brushing or by spraying and allowed to hard-dry. The gloss from the entire surface shall then be gently removed and the surface dusted off. The second finishing coat shall then be applied by brushing or by spraying.

5.15 At least 24 hours shall elapse between the application of successive coats. Each coat shall vary slightly in shade and this shall be got approved by the ENGINEER.

5.16 Minimum dry film thickness of each coat of finish paint of synthetic enamel shall be 25 microns. Minimum dry film thickness of other finish paints shall be as specified in the respective item of work.

5.17 The thickness of film shall be measured by an Elcometer to be supplied by the CONTRACTOR. The CONTRACTOR shall calibrate the Elcometer frequently for different settings. Necessary calibrating accessories should be kept ready for calibration/testing of Elcometer at any time.

5.18 Epoxy primer and epoxy paint shall be applied within the specified pot life all as per recommendations of the manufacturer.

5.19 Surfaces inaccessible after assembly shall receive two coats of primer prior to assembly.

5.20 Surfaces inaccessible after erection, including top surfaces of floor beams supporting grating or chequered plate shall receive one additional coat of finish paint over and above the number of coats specified prior to erection.

5.21 Portion of steel members embedded/to be encased in concrete shall not be painted. Joints to be site welded shall have no shop paint for atleast 50mm from the welding zone. Similarly, the steel surfaces shall not be painted in areas where connection is by use of friction grip bolts. On completion of the joint, the surfaces shall receive the painting as specified.

5.22 Maintenance painting of steel structures will become necessary if the painting already carried out shows signs of chalking, hairline cracking, deep checking, fine checking, peeling, blistering and rusting. The breakdown of a paint film is progressive from the top finish paint to the primer coat and the object of maintenance painting is to renovate periodically to effectively check the breakdown and protect the steel surfaces from corrosion. It is essential that same quality of paint as specified earlier need be adopted to ensure

compatibility. The general workmanship for maintenance painting shall conform as per Clause. 7 of IS 1477-Part II.

5.23 CONTRACTOR shall provide suitable protection as necessary to prevent paint finishes from splashing on equipment, floors, walls etc.

## 6.0 MEASUREMENT

6.1 Method of measurement for payment for painting shall be in sq. metres, correct to two places of decimals, if so specified, in the respective item of work.

6.2 Painting work shall not be measured separately, if primer painting and/or primer and finish painting is already included in the scope of the item of work of fabrication and erection of structural steel since the rate per tonne of steel is deemed to include for painting as specified.

6.3 In cases where primer and/or finish painting work as specified is carried out on erected structural steel executed by a different agency, the method of measurement for painting shall be on the basis of tonnage of the steel erected. For this purpose, the tonnage of erected steel as certified for payment to the different agency shall be considered as the basis and no measurement will be carried out separately.

## **C. SPECIFICATIONS FOR ERECTION OF STRUCTURAL STEEL**

### 1.0 SCOPE

This specification covers the general requirements for erection of structural steel. It covers the supply and delivery of all necessary materials, labour, scaffolding, tools, tackles, equipment and everything that is necessary for the satisfactory completion of the job on schedule.

### 2.0 APPLICABLE CODES & SPECIFICATIONS

2.1 The following specifications, standards and codes are made a part of this specification. All standards, specifications and codes of practice referred to herein shall be the latest editions, including all applicable official amendments and revisions.

2.2 In case of discrepancy between this specification and other documents referred to herein, this specification shall govern. In case of discrepancy between tender drawings and this specification, the tender drawings shall govern.

#### 2.3 Structural

- (a) IS:800 Code of Practice for General Construction in Steel
- (b) IS:801 Code of Practice for Use of Cold Formed Light Gauge Steel Structural Members in General Building Construction
- (c) IS:806 Code of Practice for Use of Steel Tubes in General - Building Construction
- (d) IS:7205 Safety Code for Erection of Structural Steel Work
- (e) IS:7215 Tolerances for Fabrication of Steel Structures
- (f) IS:4000 High Strength Bolts in Steel Structure - Code of Practice
- (h) AISC Specifications for Design, Fabrication and Erection of Buildings

### 3.0 ERECTION SCHEME



3.1 Each Bid shall be accompanied by a broad erection scheme with dates and estimated completion time for various path of the work prepared by BIDDER after a thorough study of the Bid drawings and the site conditions. This erection scheme shall describe the methods proposed to be employed by BIDDER for transporting his equipments, tools, tackles, gas cylinders, electrodes and all that is necessary to site, unloading, transporting within the site, handling, assembling, hoisting and erecting of the structural steel components and the type, capacity and quantity of equipment that BIDDER proposes to bring to site for all these operations. The scheme shall also indicate the strength and tradewise composition of the work force and supervisory personnel that will be deployed by BIDDER for the various operations.

#### 4.0 ERECTION PROGRAMME

4.1 Within two weeks of the acceptance of his Bid, the successful BIDDER shall submit, a detailed erection programme. This programme shall be accompanied by a layout plan identifying the areas proposed for unloading, main storage, subsidiary storage, assembly and the transportation of equipment and fabricated material between the storage and work areas. The layout shall clearly indicate the points at which proposed erection begins, direction in which it is proposed to progress, the deployment of equipment, access route for cranes to reach work areas, etc. The locations and extent of site offices and stores, labour quarters if any, layout of electrical cables and water pipes from the tap-off points shall also be indicated in detail on the above layout. Full details of the method of handling, transport, hoisting and erection including false work/staging, temporary bracing, guying, etc. shall be furnished by CONTRACTOR in this erection programme along with complete details of the quantity and capacity of the various items of erection equipment that will be used. A site organisation chart showing the number of supervisory personnel, and the number and composition of the various gangs shall also accompany the erection programme.

4.2 Any modifications to the erection programme directed by ENGINEER for the reasons of inadequacy of the quantity and/or capacity of the erection equipment, erection personnel and supervisors, temporary bracing, guying etc., or safety of the erection methods, or stability of the erected portions of structures, or unsuitability of the erection sequence due to interference with the work of other agencies shall be incorporated by CONTRACTOR and the work shall be carried out in accordance with the revised programme. Approval by ENGINEER shall not relieve CONTRACTOR from the responsibility for the safe, sound, accurate and timely erection of structural steel work as required by ENGINEER/OWNER. CONTRACTOR shall also make no extra claims for bringing additional equipment to site for erection, if so directed by ENGINEER. CONTRACTOR shall be deemed to have visualised all erection problems while bidding for the work and no additional compensation shall be claimed on this account.

#### 5.0 SITE OPERATIONS

5.1 An experienced and qualified Superintendent shall be in full time charge of the job.

5.2 CONTRACTOR shall complete all preliminary works at site well before the arrival of structural steel, such as establishment of a well equipped and adequately staffed site office, stores, unloading gantry, unloading and pre assembly yard, labour quarters if any, electrical and water connections, electrical winches, derricks, cranes, compressors, all tools and tackles, rivet guns, welding sets, torque wrenches, spud wrenches, staging, etc. as well as experienced erection and supervisory personnel as part of this contract and any other work that may be necessary so as to start erection immediately after the arrival of the first batch of steel at site.

5.3 CONTRACTOR shall furnish at his own expense, the necessary non- inflammable staging and hoisting materials or equipment required for the erection work and shall remove and take them away after completion of the job. CONTRACTOR shall also provide necessary passageways, fences, safety belts, helmets, lights and other fittings to the satisfaction of OWNER/ENGINEER and to meet the rules of local authorities and for protection to his men and materials. A licensed electrician shall be kept on the job for the entire duration of the work to maintain CONTRACTOR's electrical equipment and connections.

5.4 CONTRACTOR shall protect all existing plant, structures, piping, conduits, equipment and facilities against damage during erection. Any damage caused by CONTRACTOR shall be rectified entirely at CONTRACTOR's cost, to the satisfaction of OWNER/ENGINEER. If work has to be carried out adjacent to existing switch yards or electrical installations which are live, CONTRACTOR must ensure suitable safety precautions in consultation with ENGINEER.

5.5 If a portion of the work of the project area cannot be made available to CONTRACTOR for his activities due to operations being carried out by other agencies, he shall suitably modify his sequence of operations so as to continue work without interruption. CONTRACTOR shall work in coordination with other agencies working on the project site and plan his work suitably so as not to hinder the progress of construction at site.

#### 6.0 ACCEPTANCE OF STEEL. ITS HANDLING & STORAGE.

6.1 Point of delivery of fabricated steel shall be as specified in Data Sheet A.

6.2 CONTRACTOR shall carefully check the steel to be erected at the time of acceptance. Any fabrication defects observed should be brought to the notice of OWNER) ENGINEER.

6.3 No dragging of steel shall be permitted. All shall be stored 300mm above ground on suitable packing to avoid damage. It shall be stored in the order required for erection, with erection marks visible. All storage areas shall be prepared and maintained by CONTRACTOR. Steel shall not be stored in the vicinity of areas where excavation or grading will be done and, if so stored temporarily, this shall be removed by CONTRACTOR well before such excavation and/or grading commences to a safe distance to avoid burial under debris.

6.4 Scratched or abraded steel shall be given a coat of primer specified under Data Sheet A for protection after unloading and handling prior to erection. All milled and machined surfaces shall be properly protected from rust/corrosion by suitable coating and also from getting damaged.

#### 7.0 ANCHOR BOLTS & FOUNDATIONS

7.1 CONTRACTOR shall carefully check the location and layout of anchor bolts embedded in foundations constructed , to ensure that the structures can be properly erected as shown on the drawings, Any discrepancy in the anchor bolts/foundation shall be reported to ENGINEER.

7.2 Levelling of column bases to the required elevation may be done either by providing shims or three nuts on the upper threaded portion of the anchor bolt. All shim stock required for keeping the specified thickness of grout and in connection with erection of structures on foundations, crane brackets or at any other locations shall be of good M.S. plates and shall be supplied by CONTRACTOR at his cost.

7.3 A certain amount of cleaning of foundations and preparing the area is considered normal and shall be carried out by CONTRACTOR at not extra cost.

7.4 Where beams bear in pockets or on walls, bearing plates shall be set and levelled as part of the work. All grouting under column base plates or beam bearing plates will be carried out by CONTRACTOR, unless the grouting is specifically excluded from the CONTRACTOR'S scope.

#### 8.0 ASSEMBLY & CONNECTIONS

8.1 Field connections may be effected either by riveting, bolting, welding or by use of high strength friction grip bolts as specified in Data Sheet-A and as shown on the design and erection drawings.,

8.2 All field connection work shall be carried out in accordance with enclosed Data Sheet - A. All bolts, nuts, washers, rivets, electrodes required for field connections shall be supplied by Erector free of cost.

8.3 All assembling shall be carried on a level platform.

8.4 Drifts shall be used only for drawing the work to proper position and must not be used to such an extent as to damage the holes. Size of drifts larger than the nominal diameter of hole shall not be used. Any damaged holes or burrs must be rectified to the satisfaction of ENGINEER.

8.5 Corrections of minor misfits and reasonable amount of reaming and cutting of excess stock from rivets shall be considered as a part of erection. Any error in the shop, which prevents proper fit on a moderate amount of reaming and slight chipping or cutting, shall be immediately reported to ENGINEER.

## 9.0 ERECTION

9.1 All structural steel shall be erected as shown on the drawings. Proper size steel cable slings, etc., shall be used for hoisting. Guys shall not be anchored to existing structures, foundations, etc. unless so permitted by ENGINEER in writing. Care shall be taken to see that ropes in use are always in good condition.

9.2 Steel columns in the basement, if any, are to be lowered and erected carefully with the help of a crane and/or derrick without damaging the basement walls steel or floor.

9.3 Structural steel frames shall be erected plumb and true. Frames shall be lifted at such points that they are not liable to buckle and deform. Trusses shall be lifted only at node points. In the case of trusses, roof girders, all of the purlins and wind bracing shall be placed simultaneously and the columns shall be erected truly plumb on screed bars over the pedestals. All steel columns and beams shall be checked for plumb and level individually before and after connections are made. Temporary bracings shall be introduced wherever necessary to take care of all loads to which the structure may be subjected, including erection equipment and the operation thereof. Such bracings shall be left in place as long as may be required for safety and stability.

9.4 Chequered plates shall be fixed to supporting members by tack welding or by countersunk bolts as shown/specified in relevant drawings and/or as directed by ENGINEER. The edges shall be made smooth and no burrs or jagged ends shall be left. While splicing, care should be taken so that there is continuity in pattern between the two portions. Care should also be taken to avoid distortion of the plate while welding. The erection of chequered plates shall include:

- (a) Welding of stiffening angles/vertical stiffening ribs
- (b) Cutting to size and making holes to required shape wherever necessary to allow service piping and/or cables to pass through
- (c) Splicing as shown in relevant drawings
- (d) Smoothing of edges
- (e) Fixing of chequered plates by tack welding or by countersunk bolts (U Providing lifting hooks for ease of lifting.

9.5 As erection progresses, the work shall be securely bolted to take care of all dead load, wind, seismic and erection stresses.

9.6 No riveting or welding or final bolting shall be done until the structure has been properly aligned and approved by ENGINEER. No cutting, heating or enlarging of the holes shall be carried out without the prior written approval of ENGINEER.

## 10.0 INSPECTION

10.1 ENGINEER/OWNER or their authorised representatives shall have free access to all parts of the job during erection and all erection shall be subjected to their approval. In case of faulty erection, all dismantling and re-erection required will be at CONTRACTOR's cost. No paint shall be applied to rivet heads or field welds or bolts until these have been approved by ENGINEER.

## 11.0 TOLERANCES

Tolerances mentioned below shall be achieved after the entire structure or part thereof is in line, level and plumb. The tolerances specified below do not apply to steel structures where the deviations from true position are intimately linked with and directly influence technological process. In such cases, the tolerances on erected steel structures shall be as per recommendations of process technologists/suppliers which will be indicated in the drawings.

## 11.1 Columns

## 11.1.1 Deviation of column axes at foundation top level with respect to true axes :

- (a) In longitudinal direction :  $\pm 5$  mm  
 (b) In lateral direction :  $\pm 5$  mm

11.1.2 Deviation in the level of bearing surface of columns at foundation top with respect to true level :  $\pm 5$  mm

## 11.1.3 Out of plumbness (verticality) of column axis from true vertical axis, as measured at column top :

(a) For columns upto and including :  $\pm 1/1000$  of column height  
 15 metres in height in mm or  $\pm 15$ mm  
 whichever is less

(b) For columns exceeding 15 :  $\pm 1/1000$  of column height  
 metres in height  
 in mm or  $\pm 20$  mm  
 whichever is less

11.1.4 Deviation in straightness in longitudinal :  $\pm 1/1000$  of column height  
 and transverse planes of column at any : in mm or  $\pm 10$  mm  
 point along the height : whichever is less

11.1.5 Difference in erected position of adjacent :  $\pm 10$  mm  
 pairs of columns along length or across  
 width of building prior to connecting  
 trusses/beams with respect to true distance

11.1.6 Deviation in any bearing or seating level :  $\pm 5$  mm  
 with respect to true level

11.1.7 Deviation in differences in bearing levels :  $\pm 10$  mm  
 of a member on adjacent pair of columns  
 both across and along the building

## 11.2 Trusses And Beams

11.2.1 Shift at the centre of span of top chord :  $\pm 1/250$  of height of truss in  
 member with respect to the vertical plane mm or  $\pm 15$  mm whichever  
 passing through the centre of bottom chord is less

11.2.2 Lateral shift of top chord of truss at the :  $\pm 1/1500$  of span of truss in  
 centre of span from the vertical plane mm or  $\pm 15$  mm whichever  
 passing through the centre of supports is less  
 of the truss

11.2.3 Lateral shift in location of truss from its :  $\pm 10$  mm  
 true vertical position

11.2.4 Lateral shift in location of purlin true :  $\pm 5$  mm  
 Position

11.2.5 Deviation in difference of bearing : i)  $\pm 20$  mm for trusses  
 levels of trusses or beams from ii) For beams :  
 the true difference Depth < 1800mm :  $\pm 6$ mm

			Depth > 1800mm: $\pm 10$ mm
11.2.6	Deviation in sag in chords and diagonals of truss between node points	:	$1/1500$ of length in mm or 10mm whichever is smaller
11.2.7	Deviation in sweep of trusses beams etc.	:	$1/1000$ of span in mm in the horizontal plane subject to a maximum of 10 mm
11.3	Crane Girders & Rails		
11.3.1	Shift in the centre line of crane rail with respect to centre line of web of crane girder	:	$\pm 5$ mm
11.3.2	Shift in plan of alignment of crane rail with respect to true axis of crane rail at any point	:	$\pm 5$ mm
11.3.3	Difference in alignment of crane rail in plan measured between any two points 2 metres apart along rail	:	$\pm 1$ mm
11.3.4	Deviation in crane track with respect to true gauge		
	(a) For track gauges upto and including 15 metres	:	$\pm 5$ mm
	(b) For track gauges more than 15 metres	:	$\pm [5 + 0.25 (S-15)]$ where S in metres is true gauge
11.3.5	Deviation in the crane rail level at any point from true level	:	$1/1200$ of the gauge distance or $\pm 10$ mm whichever is less
11.3.6	Difference in the crane rail actual levels between any two points 2 metres apart along the rail length	:	$\pm 2$ mm
11.3.7	Difference in levels between crane track rails at		
	(a) Supports of crane girders	:	$\pm 15$ mm
	(b) Mid span of crane girders	:	$\pm 20$ mm
11.3.8	Relative shift of crane rail surfaces at a joint in plan and elevation	:	2 mm subject to grinding of surfaces for smooth transition
11.3.9	Relative shift in the location of crane stops (end buffers) along the crane tracks with track gauge S in mm	:	$1/1000$ of track gauge S in mm subject to maximum of 20 mm
11.4	Chimneys And Towers		
11.4.1	Out of plumbness (verticality) from the true vertical axis	:	$1/1000$ of the height of the chimney or tower in mm
11.5	Bunkers		

- 11.5.1 Deviation in length of bunker from true length :  $\pm 1/1000$  of length in mm
- 11.5.2 Deviation in width of bunker from true width :  $\pm 1/1000$  of width in mm
- 11.5.3 Deviation in height of bunker from true height :  $\pm 1/500$  of height in mm
- 11.5.4 Deviation in diagonal length in any horizontal cross section from the true diagonal length :  $\pm 1/500$  of diagonal length in mm

## 12.0 PAINING

12.1 After steel has been erected, all bare and abraded spots, rivet heads, field welds, bolt heads and nuts shall be spot painted with primer specified in Data Sheet A. Before paint is applied, the surface shall be dry and free from dust, dirt, scale and grease. All surfaces inaccessible after erection shall receive two coats of the approved paint before erection.

## 13.0 METHOD OF MEASUREMENT

13.1 For the purpose of payment, the weight of the actual, completed structures shall be calculated from the approved drawings for different items of work. CONTRACTOR shall submit to OWNER relevant material list containing weight of each item.

13.2 No allowance will be permitted for weights of rivets, bolts, washers, screws etc. in calculating the weight of the completed structure. No allowances will be permitted for galvanizing, welding or for rolling margins. One tonne for the purpose of payment shall mean ONE METRIC TONNE i.e. 1000 Kg.

13.3 The weight of a member made out of standard rolled sections such as beams, channels, angles, etc. shall be based on the weight of the member given in IS 808, without deducting for holes, notches, bevel cuts, etc. Where a component consists of a cut joist or channel, the full weight of the rolled section shall be considered only if more than half the depth of the section is used. Otherwise only half the section unit weight shall be taken. Deductions shall be made in the weight of gussets/plates including chequered plates for skew cuts, notches and openings of 900 sq.cm. or larger.

13.4 For gussets/plates used in trusses, bracings, columns, beams etc. the area shall be that of the minimum circumscribing rectangle, except as stated in clause 13.3 above.

13.5 The weight of any built-up member shall be separated into the weight of each component.

13.6 Erection bolts installed by erector may be left in position on completion of erection; however, no additional payment shall be made either for supply or use of such bolts. If erection bolts are removed after erection is complete, holes shall be plug welded and ground smooth. No extra payment shall be made for such plug welding.

## 14.0 CLEAN UP OF WORK SITE

14.1 During erection, the CONTRACTOR shall without any additional payment, at all times keep the working and storage areas used by him, free from accumulation of waste materials or rubbish. Before completion of erection, he shall remove or dispose of in a satisfactory manner all temporary structures, waste and debris and leave the premises in a condition satisfactory to OWNER/ENGINEER.

-----  
Signature and stamp of the Contractors

SECTION EIGHT

SPECIFICATIONS

## 1.0 **REINFORCED CONCRETE WORK**

### 1.1 CEMENT -----

#### 1.1.1 General

Cement shall comply with the requirements of  
IS : 269 Specifications for ordinary and low heat Cements.

**Cement shall be of 43/53 grade for RCC work and 43 grade or blended for plaster, brick masonry etc. unless otherwise instructed. Cement used in the actual work shall correspond to that upon which the selection of concrete proportion was based.**

#### 1.1.2 Storage

Cement shall be stored in weather-tight buildings, bins or silos which will exclude moisture and contamination.

Arrangements shall be made for stacking the cement bags at least 15 cm. clear off the floor. A space of at least 60cms all round shall be kept between the exterior walls and the stacks. Bags shall not be stacked more than 12 bags high. For more than 6 bags high, the bags shall be arranged in header stretcher manner. During rainy season stacks of bags shall be efficiently covered with 700 gauge polythene sheet or other suitable water proof material.

Consignments as received shall be stored separately so as to provide easy access for identification and inspection. The bags from every consignment shall be so arranged that cement is used in sequence in which it is received, i.e. consignment received first shall be used up first. The contractor shall keep an accurate record of the receipt of cement consignments and their use in the work. Copies of record shall be supplied regularly to the Project Manager.

Provision for storage shall be ample and have a capacity to store sufficient cement to allow sampling and testing at least 15 days before use.

#### 1.1.3 Testing

Cement shall be sampled as per IS 3535 'Methods of Sampling Hydraulic cements' and tested as per IS 4031 'Methods of physical Tests for Hydraulic Cement.' and IS 4032 'Methods of Chemical Tests for Hydraulic Cement.'

Before designing the mix of concrete and proportioning its ingredients. Every consignment shall be further tested to verify all characteristics upon which the concrete mix design was based. Samples shall be taken within one week of delivery and all tests shall be commenced within one week of sampling.

Cement not complying with code requirements shall not be used in the works.

### 1.2 ADMIXTURES -----

### 1.2.1 General

Admixtures to be used in concrete, when specified or permitted, shall comply with the requirements of

IS 2645 `Specification for integral Cement waterproofing Compounds.

IS 9103 `Specification for Admixtures for Concrete.'

Admixtures used in the work shall be of the same composition as used in selecting the required concrete proportions.

Admixtures shall be used as per their manufacturer's specifications and directions.

### 1.2.2 Storage

Admixtures shall be stored in such a manner as to avoid contamination, evaporation or damage. Liquid admixtures shall be protected from temperature conditions which would adversely affect their characteristics.

### 1.2.3 Testing

Admixtures shall be tested to verify the manufacturer's claim.

## 1.3 WATER

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### 1.3.1 General

Water used for mixing and curing shall be clean and free from injurious amounts of oils, acids, alkalis, salts, sugar, organic materials and other substances that may be deleterious to concrete or steel. The pH value of water shall not be less than 6 nor more than 8.

### 1.3.2 Storage

Water shall be stored at site in steel or masonry tanks and care shall be exercised to ensure that it does not get contaminated with deleterious materials.

### 1.3.3 Testing

Before commencing the concrete mix design and in the course of the work whenever the source of water changes or whenever in the opinion of the Project Manager there is reason to suspect a change in the quality of water, then the water shall be tested according to IS 3025 `Method of Sampling and Test for Water used in Industry.'

The sample of water taken for testing shall represent the water proposed to be used for concreting, due account being taken for seasonal variations. The sample shall not receive any treatment before testing. The sample shall be out with similar water.

## 1.4 AGGREGATE

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### 1.4.1 General

Aggregates shall comply with the requirements of



IS 383 'Specifications for Coarse and Fine Aggregates from Natural Sources for Concrete.'

Fine and coarse aggregates shall be regarded as separate ingredients. Each size of coarse aggregates, as well as combination of sizes when two or more are used, shall conform to the appropriate grading requirements.

The coarse aggregate shall be broken granite, trap, basalt or similar approved stone. It shall be angular in shape and with sharp corners and well graded and shall have granular or crystalline (not glossy) non-powdery surfaces. The aggregate shall be clean free from clay, loamy or vegetable matter or salts or chemicals and maximum size shall be as specified for each type.

Fine aggregate (sand) shall be river or pit sand, free from any clay, loam, earth or vegetable matter, salt or chemicals. Sand shall be well graded and shall pass through a sieve having mesh of clear 4mm sq.

#### 1.4.2 Storage

Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of like aggregates. Each size of aggregate shall be stored on a separate platform or stockpiles, sufficiently removed from each other to prevent the material at the edges of the stockpiles from becoming intermixed. Natural sand shall be allowed to drain until it has reached a relatively uniform moisture content before it is used. If in the opinion of the Project Manager the aggregates are contaminated or different sizes mixed up then the contractor shall at his cost thoroughly wash the aggregates and screen them into different sizes.

#### 1.4.3 Testing

Aggregates shall be tested according to IS 2386 'Methods of Test for Aggregate for Concrete.' particularly but only for physical characteristics, limits of deleterious substances, soundness and grading, prior to use and also whenever the source of supply is changed.

#### 1.4.4 The grading of fine aggregate shall be within the range of grading Zone I and Grading Zone II of Table III of IS 383. If grading of fine aggregates can be improved by mixing two sands, the Project Manager may permit the use of crusher sand for forming the mixtures.

Fine aggregates shall not contain more than 5% by combined weight of loam, clay, silt and any vegetable impurities. The amount of fine particles shall not exceed 3% by weight for natural sand.

#### 1.4.5 After twenty four hours immersion in water, a previously dried sample of coarse aggregate shall not gain in weight more than 5%. The aggregate crushing value as per IS 383 shall not exceed 45%. For concrete surfaces subjected to abrasion this value shall not exceed 30%.

#### 1.4.6 Coarse aggregate shall be classified into following sizes.

Grading Size -----	Nominal Size -----
5 to 12 mm	10 mm
10 to 25 mm	20 mm
20 to 40 mm	40 mm
40 to 80 mm	80 mm

The grading of coarse aggregate shall be such that not more than 5% shall be larger than maximum grading size and not more than 10% shall be smaller than the minimum grading size. Between these sizes the coarse aggregates shall be well graded.

- 1.4.7 The combined grading for coarse and fine aggregates shall be as near as possible to one of the idle curves given in Road Note No.4 HMSO or other equivalent standards.

## 1.5 FORMWORK -----

The formwork shall generally comply with the requirements of IS:456.

- 1.5.1 The centering and shuttering must be properly designed as regards the stability, line and level and water tightness. The shuttering shall be substantially and rigidly constructed of timber (edges properly planed with jackplane), steel or ply (shuttering ply with or without plastic film/coating). The shuttering shall be free from holes, cracks or unevenness. The faces in contact with the concrete shall be free from adhering grout, projecting nails, splits or other defects that may mar the concrete surface.
- 1.5.2 The Contractor must produce calculations to prove the stability of the centering if asked for by the Consultant. Apart from all the dead weights of wet concrete and centering, an allowance of a live load of 500 Kg./Sq.m. shall be made.
- 1.5.3 The shuttering is to be provided at any height and for any floor height. Attention is particularly drawn to proper cross bracing of the scaffolding. For floor height more than 3.5m double cross bracing shall be provided. If timber scaffolding is proposed, the bracing shall be of rectangular timber sections. Bamboo shall not be used for bracing. The props shall be square in section and shall be perfectly straight.
- 1.5.4 All joints shall be water tight to prevent leakage of the cement slurry and avoid honeycombing. If required, for the escape of the wash-water openings shall be provided so that they can be conveniently and properly closed before commencing placing of the concrete.

Where specially specified, on the joints of shuttering ply (with or without film/coating) 50mm wide packaging tape shall be applied evenly using proper tape applicator. Only after applying tape, shuttering releasing oil or grease shall be applied.

- 1.5.5 Connections for shuttering shall be so devised that it permits of easy removal of the shuttering without damaging the concrete. The fixing and holding in position details should be such that shuttering remains secure and retains correct shape during placing and consolidation of the concrete by tamping, ramming, vibrating or other means.
- 1.5.6 Shuttering shall be erected true to line and level as required and shall be cross braced and strutted to prevent undue deformation or movement under all combination of loads.

Beam soffits shall be erected with an upward camber of 6mm for each 3m horizontal span.

Beams and slab shuttering shall be so erected that the shuttering on beam side and slab soffits can be removed without disturbing the beam bottom shuttering. Generally re-propping of beams will not be permitted. Props shall be supported on floor without any gap between floor and prop bottom supports. On ground, props shall be supported on firm, hard and unyielding (in wet condition after loading) soil and at bottom enough area of planks or cross railway slippers etc.

Column shuttering when provided of more than 2m height, shall have arrangement of providing one side of 2m height & remaining height to be provided after concreting 1.5 to 2m to limit the drop of concrete to max. 2m. To prevent loss of cement slurry from the bottom of the column shuttering, cement slurry, of enough thick consistency, shall be placed around bottom joint between shuttering and lower concrete of the column min. 4-5 hours. Some slurry will leak out but enough shall remain inside and harden to prevent cement slurry leakage from the column concreting later on.

- 1.5.7 Top shuttering shall be provided to concrete faces where the slope exceeds 1:2.5. Such shuttering shall be counter weighted or otherwise anchored against uplift.
- 1.5.8 The Contractor shall not proceed with placing reinforcement till the Engineer has approved the scheme and erection of centering.
- 1.5.9 Under normal conditions shuttering shall be carefully removed after minimum waiting period, as per following table after placing the concrete. However, the Contractor shall remain fully responsible for any damage to the concrete or safety of the structure arising out of this and if required, shall take at his own cost all the corrective measures asked by the Consultant.

<u>Members</u>	<u>Waiting period</u>
a.. Vertical sides	24 hours
b. Bottom of slabs up to 150 thk.	14 days
c. Bottom of beams	21 days
d. Heavy slabs, flat slab etc.	As permitted by the Consultant

For pozzolona cements de-shuttering period shall be extended by about 100%.

## 1.6 CONCRETE MIX DESIGN

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Concrete mixes for various specified design strength shall be worked out by the Contractor if ask for by the Consulting Engineers.

The mix proportions shall be selected to ensure that the Workability of the fresh concrete is suitable for the conditions of handling and placing, so that after compaction

it surrounds all reinforcement or tendons and ducts completely fills the formwork. When the concrete is hardened, its quality shall be such as to comply with the strength, durability and other requirements taking into account the conditions to which it will be exposed.

Any standard method of mix design may be used. For determining the "required average strength" the probability of any test result falling short of the specified minimum shall be taken as one in ten. Unless the Contractor can prove from his past experience that he is capable of achieving a high degree of control, a "FAIR" control should be assumed in the initial mix design. Before arriving at the average strength values due regard shall be given to the "Criteria Acceptance" of Site concrete.

The mixes designed by the Contractor shall be used in works only after obtaining a written approval of the Engineer. It is to be understood that the mix design shall be entirely the responsibility of the Contractor and such approval by the Engineer shall not relieve him of his responsibility in respect thereof.

The minimum cement contents for various design mixed shall be as follows :

MIX.	KG/Cu.m.
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M 150	280
M 200	320
M 250	355
M 300	395
M 350	440
M 400	475
M 450	520

## 1.7 MIXING

Thorough mixing of the concrete is essential. Mixers shall always be operated at the speed recommended by the makers. A mixing time of not less than two minutes after all materials including water have entered the mixing drum, is often recognised as a satisfactory period for mixers up to 1 Cu.m. capacity. A slightly longer mixing time may be required for mixers exceeding 1 Cu.m. capacity and for dry concrete mixes. Mixing time, however, vary according to the type of mixer and the above may be reduced in case of some modern mixers. When the concrete is mixed, the complete contents of the drum should be discharged in one operation, into the hopper or container, since the mixing time is lost and the risk of segregation occurs if the batch is discharged into a number of separate barrows or prams.

At the start of the day's work the first few batches of the concrete may be harsh and stony because of some mortar sticking to the inside of the drum and around the blades. The proportion of coarse aggregate shall therefore, be reduced for first mix or two.

The mixer should be thoroughly wash out and the blades cleaned after use, otherwise the mixing drum will soon become caked with hardened concrete. This is not only difficult to remove but impairs the efficiency of the machine.

The inside of the drum shall be inspected regularly and the blades, which are worn out or broken, shall be replaced. Inspection and regular maintenance are essential if loss of time due to a breakdown of the mixing plant is to be avoided.

Only sufficient water shall be added to the cement and aggregate during mixing to produce concrete of sufficient consistency and workability to enable it to be well consolidated, to be worked into the corners and around the reinforcement, to give required surface finish and strength.

The consistency shall be measured with standard slump test apparatus during making trial mixes and at regular interval while concreting operation. The properly measured slump shall not exceed 50mm for the slab and shall not exceed 25mm for concrete consolidated by the mechanical means.

## 1.8 PLACING

It is important that the concrete be placed in its initial position before the cement reaches its initial set. The concrete should normally be compacted in its final position within 30 min. of leaving the mixer, and once compacted, it should not be disturbed. Before the reinforcement is actually placed in position the insides of the forms should be inspected to see that they have been cleaned and oiled.

Temporary openings should be provided to facilitate inspection, especially at bottom of columns, to permit removal of all sawdust, wood shavings, cigarette ends & dirt etc.

Openings should be placed so that water used to flush the forms will drain away. No water should be left in the forms.

## 1.9 COMPACTING

1.9.1 The object of compacting is to achieve maximum density of the concrete. The concrete should, therefore, be placed a little in excess of its specified depth, so that after proper compaction its final desired depth is obtained. Rodding the concrete manually and tapping the formwork on its external face shall be continuously carried out at and near the actual pouring point. Compacting of the concrete with mechanical/electrical vibrators of continuous duty shall be done at a sufficient distance away from the pouring head, so that the vibrator is utilized only to compact the concrete and not to spread it.

1.9.2 The vibrators shall be of rotary out of balance immersion type or the electro-magnetic type and operate at a frequency not less than 4000 cycles per minute. The vibrations shall be of such power input as to produce an acceleration of 4 to 10 g/sec<sup>2</sup> in the mass of the compacted concrete.

The vibrators shall be placed such that it maintains the concrete under treatment in an adequate state of agitation such that de-aeration and effective compaction is attained at a rate commensurate with the rate of concreting. Insertion of the vibrators at about 450 mm c/c is considered Sufficient. The concrete should not be over vibrated and for this, period of insertion of the vibrator at a point shall be limited to about 15 seconds.

The concrete shall be judged as compacted when mortar fills the spaces between the coarse aggregate so as to form a glistening and even surface except for the irregularities where the coarse aggregate breaks this smooth surface. When this condition is achieved the vibrator shall be withdrawn slowly.

The vibrators shall not be placed against the reinforcing bars or shuttering, the minimum distance to be kept shall be 75mm. The compressor shall be kept in such a position that the shuttering and reinforcing bars are subjected to minimum amount of vibrations.

- 1.9.3 The Contractor shall at all times have in reserve sufficient vibrators of each variety to guard against shut down of the work occasioned by the failure of the equipment in operation and to permit the equipment to be serviced and overhauled in rotation. No concreting will be permitted in the event of power failure or vibrator failure. The Engineer may, however, at his absolute discretion, permit concreting by increasing the slump and corresponding increasing the cement contents at Contractor's cost.

#### 1.10 CURING

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All freshly placed concrete surfaces shall be protected from the elements and from defacement during further construction activities. The Contractor shall provide, as directed by the Engineer enough tarpaulins other suitable materials to cover all freshly finished concrete.

As soon as the concrete has hardened sufficiently, to prevent damage, shall be cured by maintaining it in a damp condition. This shall be achieved by the application of wet sacking or other moisture retaining coverings for vertical surfaces and sprinkling water regularly. The slabs etc. shall be kept moist by ponding water, with help of closely spaced small bunds. Water spraying shall preferably carried out with manual or electric pump and spray nozzle. The curing shall be done for a period of 14 days after placing the concrete. Extreme shall be taken to ensure that all surfaces are kept in a moist condition continuously and no local area shall be allowed to dry out intermittently.

#### 1.11 TESTING & CRITERIA OF ACCEPTANCE

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Method of sampling & testing shall be as per IS:1199 & 516.

During the preparation of the trial mix and concreting operation, 150mm (6") cubes of the concrete shall be cast in The factory made steel moulds, numbered and cured by immersing in water for the required days and tested in compression testing machine at the Contractors expense. The filling and compacting cube moulds with concrete shall be done in a method as per Indian Standards. Each time three cubes shall be tested and hence 6 or 9 cubes shall be cast at a time as required.

If the concrete cube test results shows strength below the specified strength, trial mix shall be redesigned with revised proportions of the cement and aggregates, where as for concreting at site, the concrete work of this batch shall be demolished and replaced at the Contractors expense, unless in the Consultant's opinion strength obtained does not unduly lower the safety factor then the work may remain. However, the Contractor shall

be paid for the affected RCC work in direct proportion of the strength obtained to the strength specified.

## **2.0 REINFORCING AND STRUCTURAL STEEL**

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### **2.1 REINFORCING STEEL**

The steel to be used in reinforced concrete work shall comply with the requirements of one of the following Indian Standards IS:226, 432, 1139 or 1876. Steel bars made by re-rolling old rails, bars, etc. shall not be used on any account and the Contractor shall produce proof in respect of the source of his procurement, whenever the steel is procured by him. If the results of tests conducted in an approved laboratory as per the provisions of relevant Indian Standard Specification show that the steel does not comply with these specifications, the Engineer, may, at his discretion reject the lot or lots from which the sample or samples were taken and the same shall not be used in the works but shall be removed at once from the Site of works. The work already executed with such bars may be ordered to be demolished at the Contractor's cost and no payment shall be effected for redoing the same. The completion time limit shall not be extended on account of such demolition and redoing. Testing of steel shall not be paid extra.

All steel used for reinforcement shall be free from loose scales or rust, which may be removed with a stiff wire brush and coated with neat cement wash as directed. Bars must also be free from oil or paint.

All bending shall be done cold, gradually evenly and without jerks. All protruding bars with which other bars are to be spliced later, must be protected from rusting by a coat of thin neat cement paste and the Contractor's rates shall be inclusive of this item.

The steel shall be properly braced, supported and otherwise held in position by concrete or plastic spacer blocks and steel chairs so as to prevent displacing while concreting. Tiles, lads or stone chips will not be used as spacer blocks. The correct number and size of reinforcement bars, stirrups & binders shall be provided and placed in position strictly according to the drawings and instructions. This must be supervised with proper care and checked finally by a competent foreman of the Contractor before concreting. A steel fixer should be in full time attendance, while conc reting, to adjust and fix the reinforcement.

## **3.0 EXCAVATION IN SOIL FOR FOUNDATIONS & TRENCHES**

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3.1 The Contractor will be deemed to have visited the site and enquired about surrounding area to ascertain the nature of the soil which may be encountered and accent to full responsibility for the cost of the excavation including dewatering water, by manual or mechanical means, coming in from any sources such as surface, subsoil, monsoon or any other sources. The rate to include carefully cutting and removal of defunct drainage and water supply lines or chambers, old foundations or PCC, Shoring or strutting as required etc. The rate also shall include refilling excavated materials in well-compacted

layers in excavations, spreading surplus material in the plot or disposing it outside the plot at locations approved by the authorities.

Near existing structures for excavation in rock, explosives shall not be used. The excavation in the rock to be carried out by chiseling, pneumatic equipments, chemical breakers or burning on rock for heating and then cooling immediately for cracking it.

PCC or leveling course shall be provided by the Contractor in side the excavated area only after the Consultant's approval of the strata for the required soil strength and the depth.

### 3.2 Mode of measurement

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Excavations shall be measured and paid-for for the PCC area times depth only. Any extra excavation done for working or any other reason shall not paid-for but it has to be refilled properly indicated as above without any extra payment.

## 4.0 GROUTING

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Grouts are generally classified into 3 types :

- 1) Standard grouts
- 2) Plain cement grouts
- 3) Special grouts.

The type of grout shall be as specified in the drawings.

### 1.1 Standard Grout

Standard grouts are the normally used grouts, which are prepared by mixture of cement and sand. The proportions of standard grout shall be such as to produce a flowable mixture consistent with minimum water content and shrinkage.

#### 1.1.1 The grout proportions shall be limited as follows :

Use	Grout thickness	Mix Proportions	W/C Ratio (Max)
a) Fluid Mix	Under 25mm	One part Portland Cement to one part sand	0.44
b) General	25mm and over but less than 50mm	One part Portland Cement to 2 parts of sand.	0.53
c) Stiff Mix.	50mm and above.	One part Portland Cement to 3 parts of sand.	0.53

#### 1.1.2 a) Sand shall be such as to produce a flowable grout without any tendency to segregate.

- b) Sand, for general grouting purposes, shall be graded within the following limits :



Passing IS 2.36 mm sieve	95 to 100%
Passing IS 1.18 mm sieve	65 to 95%
Passing IS 300 micron sieve	10 to 30%
Passing IS 150 micron sieve	3 to 10%

- c) Sand for fluid grouts, shall have the fine material passing the 300 and 150 micron sieves at the upper limits specified above.
- d) Sand, for stiff grouts, shall meet the usual grading specifications for concrete.

## 1.2 Plain Cement Grouts

1.2.1 Cement grout shall be prepared using ordinary portland cement along with an approved admixture to overcome operated shrinkage. It is recommended to use plasticised expanding grout admixture. Proportion or admixture quantity or water and type of mixing shall be as per manufacturer's instructions. Compatibility of admixture with the type of cement used shall be ascertained before use of any admixture with cement.

## 1.3 Special Grout

1.3.1 Ready mixed special grout shall be used wherever they are specified or called for in the drawing or as advised by the engineer. The type of grout to be used shall be as per their strength requirements and as per manufacturer's recommendation depending on the type of load they will be subjected to - light, heavy or dynamic. Generally, the type of grout selected shall have twice the strength of the base concrete. The thickness of grout shall generally vary depending on the situation and shall be in the range of 15mm to 50mm.

1.3.2 The grouts shall be prepared only to the extent it can be used within the specified potlife by the manufacturer. Any left over grout or grouts not consumed within the potlife time shall not be used and shall be discarded. The shelf life of the grouts shall also be checked before they are used. Expired date grouts shall not be used under any circumstances.

1.3.3 The grouts shall be chloride free.

1.3.4 They shall be used following strictly the manufacturer's specification.

- 1.4 a) Surfaces to be grouted shall be thoroughly roughened and cleaned of all foreign matter.
- b) Anchor bolts, anchor bolt holes and the bottom of equipment and column base plates shall be cleaned of all oil, grease, dirt and loose material.

1.5 a) Prior to grouting, the hardened concrete surfaces to be grouted shall be saturated with water.

- b) Water in anchor bolt holes shall be removed before grouting is started.

1.6 Forms around base plates shall be reasonably tight to prevent leakage of the grout. When the base is to be flow grouted, forms shall be built and securely anchored outside the base plate so as to completely confine and withstand the pressure of liquid grout under working and rodding condition without leaking and high enough to ensure the grout is in contact with the underside of the base plate, and provide a head of minimum 100 mm above the underside of the base plate. Provisions of grout holes in base plates, rodding, arrangements shall be checked prior to commencement of grouting.

1.7 Adequate clearances shall be provided between forms and base plate to permit grout to be worked properly into place.

1.8 Grouting, once started, shall be done quickly and continuously to prevent segregation, bleeding and break down of initial set. Grout shall be worked from one side of one end to the other to prevent entrapment of air. To distribute the grout and to ensure more complete contact between base plate and foundation and to help release of entrapped air, link chains or doubled over flexible steel strappings may be used to work the grout into place.

1.9 Grouting through holes in base plates shall be by pressure grouting. The pressure to be used for grouting shall be as directed by the ENGINEER.

1.10 Forms and shims shall not be removed and the anchor bolts shall not be tightened for at least twenty four hours after placing the grout. After the removal of forms and peripheral shims, area occupied by shims shall be filled and the area between the base and the edge of the foundation shall be finished smooth to allow drainage away from the base. Interconnecting piping and machinery shall not be attached to the machinery before anchor bolts are tightened. It is desirable to make these connections atleast after a minimum of seven days from the date of grouting. During this period, the grout shall be properly cured.

## 2.0 INSPECTION

2.1 All materials, workmanship and finished construction shall be subject to the continuous inspection and approval of ENGINEER.

2.2 All materials supplied by CONTRACTOR and all works or construction performed by CONTRACTOR and rejected - as not in conformity with the specifications and drawings - shall be immediately replaced at no additional expense to the OWNER.

2.3 Preliminary approvals of any materials or phase of work shall in no way relieve the CONTRACTOR from the responsibility of supplying grouting materials and or producing finished grout in accordance with the specifications and drawings.

2.4 All grouting shall be protected against damage until final acceptance by OWNER or his representative.

2.5 Upon the completion of grouting work, all forms, equipment, construction tools, protective coverings and any debris shall be removed from the area as directed by the ENGINEER.

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Signature and stamp of the Contractors

**DETAILED SPECIFICATION**

- NOTE: (1) Concrete, Steel, Paints etc. shall conform to the I.S.I. except otherwise specified.
- (2) The mode of measurement shall generally follow IS-1200 (Revised) along with other applicable parts except otherwise specified.

**SECTION - 'A'****EXCAVATION IN SOFT STRATA & HARD STRATA**

The excavation shall be carefully done to the levels, shapes and dimensions as shown in figures on the Drawings or as required by the Consultant to receive bed concrete. Should any of the excavation be taken down below the proper levels the contractor shall fill in such excavation if so instructed by Consultant at his own expenses with M-100 concrete, well rammed in position until it is brought up to the proper level. Filling in with excavated material will not be allowed for this purpose; however the Consultant's decision shall be final in such cases.

If the foundation pits and trenches are made broader or longer than that shown on drawings, the extra breadth and length shall be filled in with earth, rammed hard after the foundation are built. The contractor shall at his own expense and without extra charge, make provision for all shoring, strutting, pumping, dredging or bailing out water. The foundations shall be kept free from water while the work is in progress. The contractor shall also remove such portions of boulders or rock, as are required to make the bottom of the foundation horizontal and level. The foundations shall be inspected and passed by the Consultant before any filling work is commenced.

The excavated useful stuff shall be used for filling up the sides of the foundations and between the plinth walls in layers not exceeding 23 cm., properly rammed and watered. All surplus earth left over shall be either spread or deposited on the site as required by the Consultant or shall be carted away at places directed by the Consultant. However, contractor would be paid for this work as per the Tender Rate.

**MODE OF MEASUREMENT AND PAYMENT**

The measurements of work shall be exact length, width and depth of the foundations according to and as shown on the Drawings of the Consultant and the depth shall be measured vertically. It shall be paid per Cubic Meter, and the work shall be measured as per Drawings only. Any excavation shall include labour for excavation, spreading or stacking the excavated stuff within a radius of 15 Mtr. on site of work. No extra shall be allowed for planking and strutting or shoring of sides of excavation provided for preventing the sides from sliding.

**EXCAVATION IN ROCK**

Cutting in rock shall be done either by blasting or chiselling, as directed, to the required widths, depths and lengths. As far as possible the beds should be made in level.

**MODE OF MEASUREMENT :**

Rock excavation shall be measured by working out levels before and after excavation, measured from a permanent Bench Mark. The rates shall be per Cubic Metre. In case of small work of rock excavation the measurements of excavated rock shall be made

with stacks which shall be made with the spoils without leaving any voids and the rate shall be per Unit of One Cubic Metre. All excavation shall be done as per Drawings and to the required width, breadth and depth. A deduction of 20% shall be made in measurements for voids if work is measured by stack measurements. The spoils of rock excavation will be the property of the Employer.

Contractor has to obtain necessary permission in writing for blasting from the concerned Govt. Authorities/parties if required, before commencement of blasting work and during execution. However, Employer may make use of his good offices in giving necessary assistance to contractor in obtaining such permission, if so desired by the contractor.

Contractor has to pay all the necessary fees for obtaining such permission for blasting.

### **SECTION - ' B '**

**Note:** The contractor shall allow in his rates for all wastages in all materials, used or to be used for this work by him.

#### **STONE**

Stone for rubble masonry shall be the best of its kind, sharp angles and free from flakes, of quality approved by the Consultant.

Stone for cut stone work or masonry work shall be the best of its kind, sound, durable, free from flows, cracks, veins, crystals, minerals, salt, cavities or other defects and it shall be of uniform texture. No earthy discoloured or weathered or water born stones shall be used. All stones shall be laid on their natural beds and properly bounded in the work. It shall be from a quarry approved by the Consultants. Stones should conform to relevant I.S. specification.

#### **SAND**

Sand to be used in concreting shall be clean and of approved quality and from approved places by Consultant, free from salt, dust or other impurities. It shall be washed with clean water, if required, before use. Screened sand shall be used for plaster and masonry work. Sand should conform to I.S. specifications. No extra charges shall be paid for washing or screening or wastage of sand.

#### **METAL**

Metal for concrete in foundation work shall not be larger than 40 mm. gauge or smaller than 25 mm. and should be free from all dust or earthy substances and of stone approved by the Consultants. Flat stone chippings shall be rejected. Metal for R.C.C. work No.1 may be 6 mm to 12 mm. and No.2 may be 12 mm. to 20 mm. size (Coarse aggregate in R.C.C.). The larger aggregate (No.2) shall pass through 25 mm. dia meter mesh but not through 12 mm. dia mesh. The smaller aggregate (No.1) shall pass through 12 mm. dia mesh but not through 5 mm. dia mesh. Metal No.3 for plain cement concrete may be 40 mm. to 25 mm. and shall pass through 40 mm. dia mesh but not through 25 mm. dia mesh. The crushing strength of the metal shall be as per I.S. specifications. All metal shall be as per I.S. specifications. All metal shall be of approved quality by the Consultant.

#### **NEERU**

Neeru shall be made cut of the best quality materials. The lime shall be reduced to fine powder by grinding in a mortar mill with 160 turns. The neeru shall be kept moist until used and no more than that can be consumed in a week shall be prepared at a time. Before using the neeru, it should be tested to see that there are no unslaked particles, and it should

be got approved from the Consultant. "Sagol" if it is of quality approved by the Consultants shall be used in place of neeru. Neeru shall be sieved with fine sieve before mixing with water.

### **BRICKS**

Bricks shall be well burnt of a quality approved by the Consultants, free from lumps or grit, well burnt, sound, hard and with sharp edges and shall give a ringing sound when struck with a mallet. They should be of uniform size. No brick after 24 hours immersion in water shall absorb water more than 15% of its weight. The size of bricks shall be as per standard practices and approved by the Consultants. The bricks should conform to I.S. specifications.

### **TIMBER**

Timber shall be of best quality teak wood or as specified in the schedule of quantities, of the best descriptions, perfectly dry, well seasoned, free from sap wood, sound, straight, free from large and loose knots, cracks, shakes and other defects and any appearance of rot. It shall be of a quality approved by the Consultants. Plywood shall be of standard make and approved by the Consultants.

### **MILD STEEL, TOR STEEL, STRUCTURAL STEEL ETC.**

All steel work shall comply with the Indian Standard specifications for structural steel as well as that for reinforcement. The surfaces shall be free from rust. All steel shall be tested and shall be of Tata's or other equivalent manufacturers and approved by Consultants. All steel should conform to the latest IS-226 and IS-432 as applicable. All steel shall be tested in Laboratory before putting it in use and test results shall be submitted to the Consultant for approval. If test results are not up to the standard, then Consultants may reject the steel.

Reinforcing bars and rods 6 mm. or higher in dia metre, shall be supplied by the Employer if possible and the rates and place of delivery mentioned in Schedule-A of the Tender documents.

The Bars and Rods shall be supplied according to the available lengths and the supply shall be at the rate stipulated in Schedule-A of the Tender documents.

The contractor shall place firm indents of his monthly requirements not less than three months in advance. The contractor shall be responsible for all consequences that may arise of his failure to comply with these requirements of the procedure that may be laid therefor.

The Contractor shall make suitable arrangements for storage of steel supplied by the Employer. The Employer's representative shall have the authority at all times to inspect the storage arrangements and to suggest modifications and improvements if any, and the contractor shall comply with the same.

The storing arrangements shall be such as to afford convenience of the inspection and check of materials. Bars of the same size, length, shape and grade shall be assembled in stack and marked distinctly.

The contractor shall at all times maintain proper records showing the basis of indents, the receipts and the utilization of the steel supplied by the Employer and these shall at all times be open for inspection by the Consultants.

The steel bars shall be issued on the basis of weight of steel. The weight shall be arrived at by measuring the lengths of the bars and multiplying by same by the standard weights as per unit length given in the Table below, for any other sizes not included in the Table, standard weights as per the manufacturers catalogue shall be used. The lengths shall

be measured to the nearest ten cms. any fractions of less than 5 cms. being neglect and fractions of 5 cms. or above taken as 10 cms.

T A B L E

Sections rolled in Metric System

Bars of diametre in mms.	Weight in kg. per Running Metre
6	0.22
10	0.62
12	0.89
16	1.58
20	2.47
22	3.00
25	3.87
28	4.8
32	6.8
36	8.0
40	9.9

### **GLAZING**

Unless otherwise specified the glazing shall be patent, flattened sheet glass of Indian Make of the best quality, plain or ground. It shall weight 7.5 kg/M<sup>2</sup> (24 Ozs per Sq.ft.) upto a size of 60 cm. x 60 cm. and above that size 10 kg/M<sup>2</sup> (32 Ozs. per Sq.ft.). In case of non actinic glass it shall be of Pilkington (India) make of thickness not less than 3 mm. Glazing shall be of quality approved by the Consultants.

### **PAINTS**

Base : These shall be of the best white lead, read lead, zinc white proxide or iron of best approved make.

Varnishes : The oil shall be double boiled linseed oil and shall appear, when filled in a glass tube, pale and clear liquid. It shall taste sweet with very little odour and shall dry quickly and firmly. It shall be of Godrej, Blundell and spence or of other quality approved by the Consultants.

Solvents shall be spirits of turpentine.

Pigments : These shall be selected tints and approved make. Paints should conform to I.S. specifications.

### **MARBLE MOSAIC TILES (MM TILES)**

The Tiles shall be of 250 mm x 250 mm size with a thickness ranging from about 22 mm to 25 mm. The chips incorporated, in the coloured cement must be marble chips, but before they are so incorporated they must be washed free of all dust. The size of the chips shall vary from 6 mm to 3 mm. The top layer of the marble mosaic tiles must not be less than 6 mm thick. It must be made compact to vibrating each tile before pressure is applied to the tile.

The sand cement mix shall be in the proportion of the one part of cement to three part of sand. The mix must be made in a mixing machine. The wetting process during the mix must be through in order to ensure maximum strength. The minimum time for curing is 7

days. The colour must be permanent and fast to the action of alkali, light and weather. It should be chemically inert and must not contain any adulterant likely to cause such actions. Lead and Zinc compound shall not be used. Pigments containing more than 2.5% water soluble matter, carbon pigments and mineral blacks particularly of the ground coal type shall not be used. The Consultants reserve the right to inspect the Tiles in Factory if they so desire. Tiles shall be of quality approved by the Consultant.

### **FOR MARBLE TERRAZO TILES**

Except for size of Marble Chips which in this case shall be 12 mm to 6 mm. these Tiles shall be like Mosaic Tiles.

## **SECTION - 'C'**

### **CEMENT CONCRETE AND MORTAR**

#### **CEMENT CONCRETE FOR FOUNDATION WORKS**

All cement concrete for foundations shall have the mix as specified on the Drawings or as per written instructions of the Consultants. If hand mixed, cement, sand and metal shall be accurately gauged using 10% extra cement and thoroughly mixed on a platform by being turned over atleast, twice dry and twice wet. Water shall be added gradually and no more shall be used than necessary to sufficiently wet the materials. It should be deposited gently in the trenches in horizontal layers of not more than 15 cm. thick and gently levelled by suitable rammers. No more concrete shall be mixed that can be used within half an hour. After lying, the concrete shall be kept wet for the required curing period. Rate shall be per Cubic Metre.

NOTE: Hand mixing will only be allowed if the total quantity of work is very small. Concrete should conform to I.S.Specifications.

#### **PROPORTIONS**

The various mixes of concrete. In the various parts of the work specified on the Drawings shall be accurately followed. The quantity of water used shall be the minimum required for workability and shall be varied as required to suit humidity and the moisture content of the aggregate and sand and to produce concrete having the specified slump.

#### **DESIGN OF CONCRETE MIXES**

If the concreting is to be done either on volumetric basis or by weight batching, then in such cases the contractor has to submit the design mix alongwith the test results for such specified concrete mix, to the approval of the Consultants. However, for normal curing such test results shall be submitted after a period of 7 days curing and 28 days curing, after casting of concrete cubes, as specified for design mix. Testing of concrete cubes shall be done in the Laboratories approved by the Consultants. If a particular or specified design mix does not give satisfactory results, then the contractor has to make the variations in design mix in such a way that the design mix gives the desired results for that specified mix, subject to the approval of the Consultants to such results. If design mix is to be used then it must be got approved by the Consultants prior to using the same in item.

#### **MANIPULATION AND WORKMANSHIP**

Mixing : An approved mechanical batch mixer shall be used. The mixer and mixing platform shall be suitably protected from wind and rain. The aggregate and cement shall be first mixed dry and then after addition of water, Mixing shall be carried out until the concrete is of even colour and consistent throughout. The mixing of concrete of different mixes shall not be allowed to be carried out at one time, by the same mixer.

### **REINFORCED CONCRETE**

Aggregates for reinforced concrete shall be of stone metal sharp, clean and angular approved by the Consultants, shingle will not be allowed.

Cement concrete for reinforced concrete work and/or plain cement concrete work, unless otherwise specified, shall consist of M-80, M-100, M-150, M-200, M-250, M-300, M-350, M-400 or such mixes as the Consultant will direct from time to time during construction work.

### **MIXING**

The aggregate and sand shall be washed of all dust and silt before using. The materials shall be accurately measured and mixed as per approved design mix by the Consultants in a machine thoroughly or as on volumetric basis. The concrete shall have a specific slump.

When proportions are specifically required by weight, they shall be mixed so.

### **CONSISTENCY**

The consistency of the concrete shall be determined at all times by means of a slump cone test, the slump for concrete in the various members, shall not exceed the following:

(1)	Precast work	-	35 mm slump
(2)	Footings and Roads	-	30 mm slump
(3)	Columns	-	50 mm slump
(4)	Walls (R.C.C.)	-	50 mm slump
(5)	Floor Slab	-	40 mm slump
(6)	Beams and Lintels	-	50 mm slump

The slump tests shall be carried out as per I.S.I. Care should be taken to ensure that a representative sample is taken.

### **STRENGTH**

Ordinary concrete mix on volumetric basis shall have the crushing strength as per IS-456 specifications. Ordinary concrete mix shall have minimum cement bags per cu.m. as given below

No.	Concrete Grade	Concrete mix	Minimum Cement Bags / M3
1.	M-75	1:4:8	3.40 Bags



2.	M-100	1:3:6	4.40 Bags
3.	M-150	1:2:4	6.27 Bags
4.	M-200	1:1.1/2:3	8.08 Bags
5.	M-250	1:1:2	9.90 Bags

### **TEST**

The contractor shall as and when directed by the Consultants cast 15 cm (6") cubes of the concrete of approved design mix being used in the work and after curing shall get them tested. The cost of all testing shall be borne by the contractor. Forms for such test cubes shall be provided by the contractor. The test results for such concrete cubes shall be submitted by contractor to Consultants for approval. Concrete mix for shell roof shall be controlled concrete M-200. The design mix shall be approved and tested from recognised Laboratory.

### **PLACING OF CONCRETE**

Concrete shall be placed in moulds within 15 minutes of its being mixed with water. Mechanical vibrator shall be used while laying concrete for walls, slabs, columns and means, footings etc. for carrying up concrete, a mechanical power driven hoist shall be used, if so required by the Consultants/Engineer.

### **WORK FORM** (General)

Shuttering shall be either of hard wooden planks 37 mm. thick or plywood shuttering of 30 mm thickness or of steel plates stiffened by angle iron and all approved by Consultants/Engineer. All shuttering work shall be supported on battens, beams, props and wedges and properly cross braced together so as to make the form work sufficiently rigid, strong and stable to support the wet concrete and workers. It should not yield on working and laying concrete. Beams for centering shall be carried and supported on the floor. P.C.C. with double wedges underneath and supported at intervals with props.

Props shall be either T.W. ballies of sufficient strength and length or A.C. props. Ballies props shall rest on double wedges placed over wooden sole planks of minimum 37 mm thickness so as to facilitate tightening and casing of the centering and shuttering work.

Shuttering shall be kept clear of wall bearing or column bearing and made to rest on cross beams or battens. The shuttering shall have smooth and even surface and its joints shall be close tight and shall not permit leakage of cement slurry or water. Foam oil shall be applied to the inner faces of shuttering work which will be coming in contact with concrete work, to prevent adherence of concrete to shuttering materials.

All shuttering and centering work shall be removed as specified. All shuttering and centering work shall be removed slowly and carefully without any jerks of vibrations in such a way that no part of concrete is damaged and disturbed.

The contractor shall apply all necessary centering (false work) including planks, props, bracing, nails etc. and all necessary labour, plant and machinery etc. for fixing centering of accurate size and shape for the various members of concrete is as also the labour and tools required for striking the same.

Forms shall be carefully examined to see that they are truly vertical and horizontal and the joints properly closed. When forms are to be reused they should be carefully examined before such reuse, properly aligned and have all open joints repaired and coated with a separator.

Centering and props for the various R.C.C. members shall be fixed in a workman like manner and shall be approved by the Consultants or Engineers. They shall be of such sizes as the Consultants or Engineer think fit and proper. The centering shall be removed only after permission to that effect has been obtained from the Consultants or Engineers. Props shall not be less than 75 mm dia on top and shall be supported on wedges and planks. Planks shall not be less than 25 mm thick. The centering planks, runners and props shall of such dimensions as are required by static calculations to be approved by the Consultants or Engineers. For special type of work complete Drawings showing arrangement of centering shall be submitted, if demanded by the Consultant or Engineers.

The area of form work coming in contact with specified concrete work shall only be measured for payments, if there is separate item for providing form work for concrete work in the Tender.

The minimum period for keeping the centering in position for curing, after laying the materials, shall be as follows:

Name of work	Centering	Watering
Slab in general	10 Days	Water shall be empounded on slabs by making 1 M x 1 M. Ponds by bunds of cement mortar. Column shall be wrapped with a jute cloth.
Single Slab	Upto the completion of the stroy above	Beams shall also be so covered with jute cloth. All concrete to be kept wet for a minimum period of 20 days.
Under the side of Beams and Lintel bottoms	20 Days	
Vault Roof slab flat slab	20 Days	
Side of the beams	2 Days	
Side of the column	2 Days	
Side of the lintels	2 Days	
Coping sides	2 Days	
Shell Roof	As per the instructions given in Drawing	

### **COVER TO REINFORCEMENT**

Cover to reinforcement shall be in accordance with that indicated on the R.C.C. Drawings and shall be maintained by the use of precast cubes or cover blocks, of the size equal to the cover specified, or by mild steel bar spacers (equal in diameter to the cover specified). These will not be measured and paid separately.

### **BENDING AND PLACING REINFORCEMENT**

The reinforcement bar shall be mild steel/tor steel as specified and shall conform to relevant specifications given in Section (B). It shall be accurately bent cold to the shapes shown on the R.C.C. Drawings and all bends shall conform to the details supplied. The reinforcement shall be built up exactly as shown on the detailed Drawing and supported so as to give correct cover. All inter sections of bars shall be secured tightly with binding wires. Stirrups shall be secured tightly to the bars which they embrace and shall be kept from the faces of the concrete of the distance shown on the Drawings.

The iron bars shall be free from scale or rust and shall be properly brushed and not painted. They shall be of diameters specified and bent to shapes as dimensioned and placed in position shown on the plans and ends shall be hooked, the hook being eight times the Dia.M. of the bars. No splicing shall be allowed in short members. Where there is splicing, the bars shall overlap for tension and for compression as per Drawings but excluding the hooked ends. They shall be bound together by binding wires. The reinforcement shall be approved and measured by Consultants or their Engineers before concreting is started. The concrete shall be worked round the reinforcement and well vibrated. For consolidation of concrete in columns, beams, walls & slabs, Mech. immersion vibrators shall be used. Where concrete is measured excluding steel only that steel actually in concrete shall be measured, but no allowance shall be made for wastage. Binding wire, laps or welding if any, steel used for maintaining reinforcement in position shall not be measured. Laps other than those shown on Drawings will not be measured and paid separately, but contractor has to provide the laps as shown in Drawing. The rate shall be inclusive of all.

### **COPING AND SILLS**

Reinforced or plain cement concrete copings and sills shall be of the full thickness of the walls or will be as of specified thickness and width and of specified concrete mix and finished and moulded as per Design and Drawings. They shall be reinforced as per Design. While casting the coping, the concrete shall be vibrated properly. Concrete mix shall be as specified on Drawings.

### **LINTELS**

These shall be of dimensions as shown on the Drawings and shall have a minimum bearing equal to the depth of the lintels on both sides of the opening unless otherwise directed. The centering shall not be nailed to the door or window frames. The concrete mix shall be as specified on the Drawing.

### **BEAMS AND SLABS**

The cover below the lowest bar in beams shall be 25 mm. or the diameter of the thickest bar whichever is more and cover for bars in slab shall be 20 mm. or as shown on Drawings. The work of filling in beams and slabs shall be completed in one operation as far as possible. If concreting is to be stopped permission shall be obtained from the Consultants or Engineers and it shall be stopped at the centre of the beam or wall as the case may be, for the slabs in a vertical plane and at right angles to the direction of beams, or as directed. After the forms are struck, the surface shall be properly picked and hacked immediately and a mixture of sand and cement dashed against the surface making the surface true in one plane. The surface shall then be plastered with sand and cement mortar and finally finished smooth with a fine coating or neeru. The visible edges of beams and columns shall not be knife sharp but shall be finished as per Design and cornices, if any at the junction of slabs and beam or walls shall also be finished as per Design. The surface then shall receive two coats of white wash.

### **MODE OF MEASUREMENTS AND PAYMENT**

The rate for all R.C.C. members shall be exclusive of steel as reinforcement and finishing unless otherwise specified. Columns shall be measured in Cubic Metres of the actual work done between the slab. All beams shall be measured between the slabs, beams being measured between columns. Slabs shall be measured in between columns. Slabs shall be measured in Square Metre as of specified thickness, and of specified mix or in M3 as shown on the Drawings.

Chajjas and canopies shall be measured in Sq.Metre clear of walls and of specified thickness and of specified concrete mix. If the fascia form or a drop or pardi has been provided. It shall be measured in Square Metre separately and paid under pardi item. Lintels shall be measured in Cubic Metres for actual length provided. The sizes of all R.C.C. members shall be measured exclusive of finishing and as per dimensions on Drawings.

Steel reinforcement bars shall be measured and shall be paid as the weight in Kg. of the actual quantity of steel reinforcement placed in structure arrived at by measuring the length of the bars multiplied by the standard weight per Unit length for particular diameter of the bar given in relevant para of Section (B).

In case of deformed bars the weight per Unit length for bar of specified diameter shall be as shown in the manufactured catalogue. This shall include quantity of laps, hooks and bends.

The cost of wire used for tying reinforcement steel chairs and angles etc. shall be deemed to be included in the rate of the item of reinforcement and shall not be paid for separately.

## **SECTION - 'D'**

### **STONE MASONRY**

#### **RUBBLE AND CEMENT MORTAR MASONRY**

Stone, Sand and Cement used shall conform to the relevant specifications given in Section (B). Mortar shall be as specified in item.

All stones shall be laid on their natural beds and properly bonded in the work. No hollow spaces shall be left.

Inter spaces shall be filled with mortar and stone chips driven in and not with only mortar. Work shall be in plumb and joints broken vertically. Bond stones not less than the width of the wall or 68 cms. in length shall be provided. 1.5 M. c/c staggered in every course. The height of the courses shall not exceed 38 cms. Work shall be well watered thrice a day for 20 days after completion. When the work is stopped for the day or on holidays or when upto the full height, tables shall be formed on the surface and kept full of water. At least 35% mortar shall be used in walls.

#### **MODE OF MEASUREMENT AND PAYMENT**

The measurement shall be the actual cubical contents of the masonry after deducting all openings, beams, columns, etc. as is applicable. No deduction will, however be made in the cubical contents for khandki facing. No extra charge shall be allowed for bond stones.

#### **DRY RUBBLE PACKING OR SOLING**

It shall be 23 cms. thick unless otherwise specified and shall be hand packed with stone from approved quarries and the interstices filled in tight with small chips and hard murum and watered and rammed hard. The work shall be measured in Square Metre as per work executed.

**SECTION - 'E'****BRICK MASONRY****CEMENT MORTAR**

Cement mortar shall be normally composed of one parts of cement to six parts of sand unless otherwise specified, the ingredients shall be accurately gauged by measure and shall be well and evenly mixed together dry on a platform, care being taken not to add more water than is required. No mortar that has began to set shall be used.

Where a different preparation is specified that shall be the proportion used in that particular place. Contractor at his own expenses shall be required to test the cement mortar, if found necessary and the test result shall be submitted to the Consultants or Engineers for approval.

**BRICK WORK**

Brick work is to be carried out with all necessary setbacks, projections, cuttings, footings etc. which are shown on Drawings and in strict conformity with them. All uneven, irregular and bad brick work shall be demolished if deemed necessary by the Consultants or Engineers and rebuilt at contractor's risk and cost.

All joint of brick work to be plastered or pointed, shall be properly raked out to a depth of 12 mm. as the work proceeds. In no case, mortar which has set shall be removed from joints by hammering, chiselling or in a manner as to cause no damage to the bricks, but shall be raked out with a suitable metal tool before the mortar sets.

Every brick shall be thoroughly soaked in water before using, till bubbles cease to come up. No broken bricks shall be used except as closers. The courses shall be truly horizontal and the work strictly in plumb, joints shall be broken vertically and they shall not exceed 12 mm in thickness. The brick work shall not be raised by more than 10 coursed per day. Tables shall be formed at every eleventh course and kept full of water. The bricks shall be laid in English bond.

In bricks arches or other circular work, the brick shall be shaped to slope joints radiating correctly to the centre, from front to back of walls and not more than 12 mm. thick. The face bricks shall be of uniform colour and have sharp arises. The work shall be well watered three times a day for 10 days and afterwards twice a day 21 days. The brick to be used in work shall conform to I.S. specifications. Good quality locally available bricks can also be used if approved by the Consultants or Engineers. The work shall be protected during the rains as directed.

**MODE OF MEASUREMENT AND PAYMENT**

The rate of brick work shall be inclusive of all necessary scaffolding, centering, watering and cutting of bricks for circular work, arches, corbels, projections etc.

The measurement of work shall be the produce of length, height and thickness. Deduction shall be made for all openings, lintels, beams and columns occupying the full thickness of the walls. The work shall be paid per unit of one Cubic Metre or Square Metre as given in schedule of quantities.

**BRICK PARTITIONS (Reinforced)**

Brick partitions shall be of  $\frac{1}{2}$  brick width or brick on edge when so specified. Partitions of  $\frac{1}{2}$  brick thickness shall have one R.C.C. M-150 bonding layer, 2 layers high and of full width. It shall be reinforced with 4 numbers of 6 mm. Dia M.S. bars with stirrups of 6 mm Dia. M.S. bars at 20 mm c/c. Cement mortar used for masonry will be 1:6 or as specified and when there are doors in such partitions the bend will be on top of such door.

For bricks on edge partitions separate specifications will be indicated in the job description, in schedule of quantities.  $\frac{1}{2}$ " brick partitions will be measured in Sq.Metre without plaster. No allowance shall be made for concrete band or shuttering. Reinforcement will be measured and paid separately, under M.S. reinforcement item for R.C.C. pardi.

### **FAIRFACE**

All 115 mm, 125 mm, 350 mm and 450 mm walls will be built fairfaced on the side only. All walls of greater thickness shall be built exception with faircase to both sides.

## **SECTION - 'F'**

### **PLASTER**

#### **CEMENT PLASTER (Neeru)**

Cement shall be thoroughly mixed dry with sand in the proportion of one to four or as specified. Water shall then be added gradually to make the mixture homogeneous. No more cement mortar shall be mixed than that can be used within half an hour. The joints between the stones or bricks will be racked out to a depth of 12 mm. and the surfaces shall be thoroughly watered and the mixture of sand and cement applied evenly on all surfaces to be plastered. The surface shall be finished off with a thin layer of neeru. The plaster work shall be kept thoroughly wet for a period of seven days. The item shall be paid per Sq.Metre. Local sand if approved by the Consultant or Engineer can also be used for plaster work.

The rate shall include jambs, covers at the junction of walls, ceiling and beams and all corners. Deductions for openings, doors, windows, etc. shall be made as per I.S. specifications.

#### **SANDFACED CEMENT PLASTER**

All surfaces shall be cleaned of all dust and dirt and the brick work thoroughly watered. The backing coat shall be 12 mm thick of cement plaster in the ratio of 1:4 and a finishing coat 6 mm thick consisting of grey cement and sand shall be applied on the surface. After curing this first coat sufficiently, a finishing coat 6 mm thick consisting of grey cement and sand of approved quality in C.M. mix (1:3) shall be applied and finished to desired texture. Local sand if approved by the Consultant or Engineers can also be used for sandfaced cement plaster. The average plaster thickness shall be 16 mm to 20 mm.

The mode of measurement shall be the same as per cement plaster, and deductions shall be made as per I.S. specifications.

#### **CEMENT POINTING**

Mortar shall be racked out of the joint to a depth of 12 mm. Dust shall be brushed out of the joints and the wall well wetted. Pointing shall be done with cement and sand mixed in equal proportion or as per proportion specified. The joints of the pointed work shall be neatly finished as directed and shall be kept wet till the cementing material has set and become hard. Curing shall continue for a minimum period of seven days.

The item will be paid per Square Metre. Deductions shall be made as per I.S.specifications. Local sand can be used for this work if approved by the Consultant or Engineer.

### **ROUGH CAST CEMENT PLASTER**

All joints shall be racked out as for cement plaster. Cement shall be thoroughly mixed dry with sand and gravel to pass through 6 mm (1/4) mesh but not through 1.5 mm (1/16") in the proportion of 1 part of cement. 2 parts of sand and 1 part of gravel. Water shall be gradually added to make the mixture homogeneous. No more mixture shall be prepared that what cement be used within half an hour. The mixture shall be dashed against the surface to a thickness of 20 mm. and finished level. The mode of measurement shall be the same as for cement plaster, curing shall continue for a minimum period of seven days. Deductions shall be made as per I.S. specifications. Average thickness of plaster work shall be 20 mm.

### **TERRACO FINISHING (Spray Plaster)**

The work of finishing to interior building surfaces shall be done by Spray Plaster of Terraco. It is a readymade mix plaster which replaces neeru finishing, putty primer and also reduces paint consumption. If the item of Terraco finishing included in the schedule of quantities, following procedure shall be adopted.

The spray plaster should be applied on dry surfaces only. Before spray plastering, the work of common type of plastering should be done without neeru and left the surfaces for complete drying. When surfaces where spray plastering is to be applied became dry, then only the spray plaster shall be applied on cement plaster likewise the application before painting the wall. Before applying the spray plaster, the dust, dirt and foreign matter should be brushed away. So also any ridges and form oil should be removed suitably. The work of spray plastering shall be done in two coats. However the work of finishing should be done up to the satisfaction of the Consultants or Engineers.

## **SECTION - 'G'**

### **TIMBER WORK**

#### **CARPENTARY WORK**

Timber shall be properly planned in a workman like manner. Joints shall be true and fit properly and of the kind directed by the Consultants or Engineers. All timber when embedded in masonry shall be coated with two coats of oil paint two days prior to erection. All exposed faces of the timber shall receive primer coat of red or yellow earth mixed with water. The wood surfaces shall be cleaned properly before applying oil paint.

If directed all timber shall be treated against white ants by application of a specified patent chemical.

The rate of wood work shall include the cost of sawing, planning, jointing, framing labour and materials for hoisting and fixing in position and all workmanship for fixing and supply of all straps, bolts, nails, spikes, keys, wedges, pins, screws etc. necessary for the framing and fixing. Joints and portions inserted in the masonry shall be measured.

The work for doors, windows, ventilators, cupboards, TW partitions shall be measured in Square Metre and outside to outside of frame work including shutters, panels, glazing etc.

All teak wood work in curved places shall be measured as the smallest piece out of which the work may be cut.

**JOINARY**

Door and Window frames shall be of 125 mm x 75 mm of 150 mm x 65 mm size or of such dimensions as directed by the Consultants or Engineers. They shall be properly framed and morticed and tenoned together and set in masonry by means of iron hold fasts. The visible surfaces shall be smooth and even. The parts hidden in the masonry shall be well oil painted. The frames shall be rebated 12 mm. on one side (if the shutters are on one side) and the full thickness of the shutter are on one side and the full thickness of the shutter shall be moulded as per design on the other side of the frame shall be rebated on both sides. During the progress of the works, the frames shall be protected from injury by necessary boxing.

Hardware and iron mongery shall be fixed to the shutters in a workman like manner to the satisfaction of the Consultants or Engineers. The rates of the various items of joinery work shall include the cost of fixing of the fixtures and fastenings.

**PANELLED SHUTTER DOOR**

The frame and shutters shall be of well seasoned teak as specified. The styles and rails shall be of thickness and width as specified, moulded and morticed together in a workman like manner. Styles and top, bottom lock and frieze rails shall be of widths and moulding as per Drawings. Each panel shall be of thickness as specified. The measurements shall be in Square Metres from outside to outside of frames and shall be paid per Square Metre. The rate shall include the cost of frames, shutters and hold fasts fittings, painting, polishing etc. as directed.

**FLUSH DOOR SHUTTER**

These shall be of 35 mm thick as directed by the Consultant or Engineer with teak or other veneer on both faces or as directed and shall be of approved make.

The work shall be measured in Square Metre from outside of frames and shall be paid per Square Metre. The rate shall include cost of frame, shutters and holdfasts, fittings, paintings, polishing etc. as directed.

**GLAZED DOORS AND SHUTTERS**

These shall be similar to panelled shutters and as shown on Drawings. Such parts as are directed shall be glazed with sheet or ground glass weighing 7.5 kg/M<sup>2</sup> or non-actinic glass as specified. Styles and rails in the glazed shutters shall be rebated 12 mm to receive the glass. Such bars shall be moulded and rebated and mitered. Glass panes shall be fixed by means of Teak beads and putty.

The work shall be measured in the same way as per panelled doors. The price per Square Metre shall include supply and fixing of glazing and heads, except where otherwise stated in the schedule of quantities. The rate shall include cost of frame shutters and hold fast, painting etc.

**FIXED LOUVERS WITH FRAMES**

Fixed louvers shall be 200 mm wide or as shown on Drawing and of 7.5 kg./M<sup>2</sup> of glass of approved quality, the slope shall be such as shall not allow direct vision in a horizontal direction, or as specified on Drawings. The work shall be measured in Square Metre inclusive of frames and hold fasts and shall be measured from outside to outside of frames and shall be paid per Square Metre.

**TIMBER AND GLAZED PARTITIONS**



Partitions shall be partly panelled and partly glazed as specified on Drawings. Teak wood members of the partitions shall be as specified. They shall be fixed to the Door by means of iron clamps rigidly fixed to the floor slab and the work shall be carried out and completed as per Drawings supplied by the Consultants or Engineers. The upper portion shall be glazed with 4 mm. thick plain glass as per Drawings. The material for panels and glazing shall be as specified in Drawings.

The work shall be measured in Square Metre and shall be paid in Unit of Square Metre.

### **HARDWARE FOR DOORS AND WINDOWS**

These shall be of the good quality and as approved by the Consultant or Engineer, for the items concerned and shall be secured in position with brass screw. No screw shall be driven by hammer or similar tool. All cuttings into the work shall be of required shape and size and no over cutting is allowed. Contractor has to supply the samples of various fixtures and fittings to the Consultant or Engineer for approval before fixing them to particular items. All these samples shall be exhibited in the Consultant's or Engineer's office or site office.

### **SECTION - 'H'**

#### **M.S.DOORS AND WINDOWS**

Steel doors and windows shall be with standard sections and sizes as mentioned on the Drawings. They shall be of approved make. They shall comply with I.S. 1038:1959.

- (i) Windows and ventilators shall be of rolled mild steel sections 25 mm wide (1.5 Kg/M) and Doors of 35 mm wide sections (Approx. 2.55 kg/M) or as specified in the Drawings.
- (ii) The frames shall be in one plane, joints shall be metered and welded on butt welding machines. Glazing bars shall be tennoned and rivetted. The inter section of T bars should have 'Fenestre' joints.
- (iii) The sections shall be given anti-rust treatment (by pickling) before shop coat of paint is applied. Final coats of paints shall be as specified. Glass panels to Doors and Windows shall be fixed by means of teak and bends putty, glazing to sky light shall be fixed as per Manufacturer's specifications. These shall be measured from outside to outside and shall be paid per Sq.Mtr. The rate shall include storing, handling and fixing in position.

### **WROUGHT IRON AND STEEL WORK**

All W.I. and steel work shall comply with specifications and design. The manufacturer shall be as approved by the Consultants or Engineers.

Grill work and grill gates shall be as per the Consultant's or Engineer's Design.

Collapsible gates will be of mild bar type, made out of 20 mm channels and will be top hung with ball bearings and will have locking arrangements as specified.

Weld mesh grills and grill gates shall be as per design. Weld mesh used therein shall be as specified. The steel enclosing frame shall consist of such sections, as are specified in the Drawing. All joints shall be properly welded.

All the W.I. and steelwork, mentioned in this section shall receive a shop coat of red lead paint before erection on site.

In the case of grill work, grill gates, collapsible gates, or welded mesh grill and failing, the work shall be measured in square Metre for supply and fixing and shall be paid per Square Metre including painting, fitting etc.

Rolling shutter shall be measured as per openings provided in masonry work for fixing the same.

In the case of steel work in trusses, purlins and other fabricated work, the work shall be measured by weight of actual work done and shall be paid per Tonne. Detailed specifications specified on Drawings or as per directions from Consultants or Engineers. The rate shall be inclusive of one coat primary red oxide paint.

## **SECTION - 'I'**

### **PAINTING**

Where the term "Paint" or "Painting" or "to be painted or Colour Wash or White Wash" etc. is used in specifications or in Bill of Quantities it includes scrapping, cleaning and painting or colour washing or distempering or white washing as the case may be, all to the satisfaction of the Consultants or Engineers.

### **PRIMING**

Neither any shop coat of paint herein specified for any priming coat shall be considered as a coat of paint for the purpose of these specifications PUTTY : Pully shall be composed of best quality of whiting mixed with double boiled linseed oil, properly kneaded to workable consistency.

### **OIL PAINT**

Surfaces to be painted shall be dry, free from dust and dirt and rubbed smooth by means of sand paper of pumice stone to the satisfaction of the Consultant or Engineer. The paint shall be mixed in proper proportion as per manufacturer's specifications and driers and pigments shall be carefully added as and when required. Alternatively mixed paints of approved quality and shade may be used.

The primary coat shall be of white zinc and double boiled oil only and shall be applied evenly. After the primary coat is applied and perfectly dried, all holes, cracks etc. shall be filled in with putty and the surfaces are prepared. Then a second coat of paint with the addition of the pigment shall be carefully applied as and when required. When the work is to be varnished, the varnish shall be best varnish mixed with turpentine if required and evenly applied in required number of coats. The rate shall be as per Sq.M. and deductions shall be as per I.S.specifications.

### **OIL BOUND DISTEMPER**

All plaster surfaces shall be thoroughly cleaned and shall receive 3 coats as specified below. First, a coat of prime shall be applied, after the primary coat of white lime wash is properly scraped off, the second and the third coat shall be applied with oil bound distemper of approved tint and quality, mixed with water as per Manufacturer's specifications. If after these operations, the work is not done to the satisfaction of the Consultants or Engineers then one more coat shall be applied without extra cost till the work is executed to the satisfaction of the Consultant/Engineer.

### **DRY DISTEMPER WASH/COLOUR WASH**

All plastered surfaces shall be thoroughly cleaned and shall receive coats of dry distemper/colour wash. At first, white lime wash shall be evenly applied and scrapped off when dry. A first coat of prime size shall then be applied. Second and third coats shall be of dry distemper or of colour wash of approved quality in mixed with water as per manufacturer's specifications. In case the work is not done to the Consultant's or Engineer's satisfaction, one or more coats shall be applied without extra cost until the work is executed to the satisfaction of the Consultants or Engineers. All the painting work shall be measured in Square Metre for actual work done including all soffits, jambs, sills, walls, plastering surfaces etc. and shall be paid per Sq.M. All deductions shall be as per I.S. specifications.

### **FRENCH POLISH**

The wood work shall be first cleaned and scrapped thoroughly with glass paper. It will then be painted with a 'filter' composed of whiting and methylated spirit and against clean with glass paper. A thin coat of French Polish shall be applied until the finishing is done to the satisfaction of the Consultants or Engineers.

### **WAX POLISH**

The work shall be done in the same way as per for French Polish with the exception that Wax Polish will be used instead of French Polish.

### **MODE OF MEASUREMENT AND PAYMENT**

The oil paint and wax polish work will be measured in Sq.Metre from outside of the framing as follows:

- |     |                                       |                                 |
|-----|---------------------------------------|---------------------------------|
| (a) | Fully glazed partition Window or Door | : Square Area of 1 face only    |
| (b) | Half paneled and half glazed          | : 1½ times the Area of one face |
| (c) | Fully paneled                         | : Twice the Area of one face    |

NOTE : The work mentioned in this section shall be measured separately only in case it is distinctly so specified in the Schedule of Quantities.

## **SECTION - 'J'**

### **SPECIFICATION FOR VARIOUS TYPES OF FLOORING, ROUGH SHAHABAD FLOORING MACHINE CUT**

Rough Shahabad stones of 35 mm. thickness shall only be allowed for use in flooring. The stones shall be hard, sound, free from veins, cracks etc. The stones shall be truly rectangular in shape after the edges are cut by machine. Floor shall have a uniform joint of not more than 3 mm.

The sub-floor or base shall be cleaned of all dirt and loose material and well wetted without forming any pools of water on the surface. Lime mortar (1:3) shall be prepared in the mixing mill on pan. It shall be laid and compacted to a reasonably true plain surface by screed battens to the required level. The cement float will be spread over the area and the stone shall be laid in line and level. The stones after placing in the position shall be gently dashed against the adjoining stones. This will fill the voids in the joints. Any surplus slurry on the joint shall be wiped clean before its setting. The surface shall be kept wet for a period of 14 days (fourteen) days.

**KOTA FLOORING / KADAPPA**

Stone slabs of kota tiles shall be hard, sound, durable, resistant to wear with a thickness of 25 mm to 30 mm. The stone shall be machine polished but dressed with hand tools and shall be of uniform colour and texture.

The tiles will be laid on cement mortar (1:6) with 2.50 cms. thick cement paste. Care shall be taken while fixing the tiles, so as not to leave any hollows in floor and joints. Where necessary, the tiles will be laid with necessary slopes for the even flow of water. All the smearing of the cement slurry or mortar shall be cleaned immediately. The edges of the adjoining tiles shall be in one plane. The curing shall be done as per instructions of Consultants or Engineer.

**KOTA DADO / KADAPPA**

The tiles to be used as described in the specifications of kota flooring. The cement plaster of about 20 mm in C.M. (1:4) shall be applied to the part of the wall where dado is to be fixed first. Before fixing, the back of the stone slabs, shall be covered with a paste of cement. The slab shall be pressed on the wall and gently tapped by wooden mallet to bring it in line and level. The joints shall not exceed 1.5 mm. Final polishing may be done by rubbing. The top of dado shall be jointed neatly with the plaster above as directed. Materials brought for work shall conform to the approved samples.

Cement mortar (1:6) shall be evenly and smoothly spread over the base with the help of screed pattern to proper level or slope. The thickness of the bedding shall not be less than 12 mm or more than 20 mm in any one plane. The tiles shall be laid on the bedding when it is still plastic but has become sufficiently stiff to offer a fairly firm cushion for the tiles.

The tiles before use shall be soaked in water for 2 (Two) hours. Cement grout of required consistency shall be read over the bedding mortar for an area that can be covered within half an hour. The edges of the tiles shall be smeared with neat white cement slurry and fixed in the grout one after the other, each tile being well pressed and gently tapped with a wooden mallet. There shall be no hollows in beds and joints. The joints shall not exceed 1.50 mm. The joints shall be grouted with a slurry of white cement. The surplus cement grout and other dirt shall be cleaned at the end of days work. The surface shall be kept wet continuously for a period of 14 days.

**CERAMIC TILE DADO WORK**

Materials used will be the same as that used for ceramic tile flooring.

Cement plaster in C.M. (1:6) shall be applied to the part of the wall where dado work is to be done. The thickness of the bedding shall not be less than 12 mm or more than 20 mm in any one place. The tiles before use shall be soaked in water for 2 hours. Tiles shall be fixed when the cushioning mortar is still plastic and before it gets very stiff, the back of tiles shall be covered with a thin layer of neat cement paste and the tile is pressed in the mortar and gently tapped by wooden mallet. The joints shall be filled with white cement slurry. The joints shall not exceed 1.5 mm. The surplus cement grout shall be cleaned before it sets. The surface shall be kept wet for a period of 14 (fourteen) days.

**M.M.TERRAZO FLOORING**

The samples shall be got approved before used. Materials brought for work shall confirm to the approved samples.

Lime mortar (1:6) shall be evenly and smoothly spread over the base with the help of screed battens to proper level. The thickness of the bedding shall not be less than 12 mm or more than 20 mm in any one place. The tiles will be laid on a cement float. The joints of the

tiles shall be filled with matching coloured cement slurry. Then the floor shall be kept wet for a period of 14 days. Polishing will be done in three coats by rotary machine, so as to get a smooth, clean and polished surface.

### **SPARKTECT TILES**

The sparktect tiles shall be used for flooring. These tiles shall be fitted likewise Mosaic, Kota or Marble on the flooring. These tiles shall be fitted in wall also as per the fitting procedure. The sparktect tiles need not to be soaked in the water before its use like glazed tiles.

### **MARBLE/GRANITE/DHOLPUR CLADDING**

Providing fixing marble/granite/dholpur stone on wall with single coat plaster in plumb line made rough to adhere the plaster dabbing on the stone back. Fixing the stone tiles or slabs with use of material like ferrafix etc. with filling the joints with the similar colour cement material with curing complete.

### **MARBLE FLOORING AND LINING**

The marble shall be as approved by the Consultants or Engineer.

The exposed surface of marble shall be polished or otherwise as specified and shall be free from scratches and other defects. The marble shall be machine cut, machine polished (if specified) free from cracks or flakes and uniform in colour. The edges shall be straight and square. The marble shall be bedded in lime/cement sand mortar with cement floated. The joints shall be laid with fine invisible joint or otherwise as instructed. The contractor shall also take care to match grains of the marble, if instructed. Marble for treads and risers shall be in one piece upto 5' length. The thickness shall be as per the Consultant's or Engineer's instructions. Marble linings to walls, columns and the like shall be fixed with copper clamps and hooks. The clamp shall be 25 x 50 x 100 mm girth, one end turned down and grouted into mortice in marble and other and built into wall, mortices shall be carefully cut and thoroughly grouted.

Wherever the marble is exposed to weather, the vertical faces must be well bonded to the base by applying glue and aggregate as per the Consultant's or Engineer's instructions. The exposed edges and mouldings shall be protected by means of timber nosing.

### **MODE OF MEASUREMENT AND PAYMENT**

All types of tiles as above shall be measured on square Meter basis and shall be paid at unit rate as agreed per Square Meter of tiles fixed.

## **SECTION - 'K'**

### **SPECIFICATION FOR WATERPROOF POLISH COAT OR RADSPAK WATERPROOFING**

The waterproofing liquid should contain epoxy resin and locker only. These two liquids should mix in a equal proportion and stirred well before applying on any dry surface. On mixing the liquid in well manner, it should be applied with a painting brush on dried surface which required to get the water proof. The aforesaid liquid is colourless. This liquid can be applied on a parapet top for preventing leakages or seepage of all on outer side so also on terrace flooring, tile flooring joints on Terrace slab, Toilet sunk slab, or Toilet flooring.

The liquid should be applied as above for prevention of leakages after curing period of slab or concrete work. It is important that application should be on dry and clean surface. However such type of work should be done upto the satisfaction of Consultants or Engineer in charge of the work.

### **SECTION - 'L'**

#### **DRAINAGE, SEWAGE, WATER SUPPLY AND STORM WATER DRAINS**

The contractor will be wholly responsible for any extra excavation done by him below the required levels as directed. Extra width of excavation will be required at the place of joints, for the facility of work of caulking the joints. This extra excavation in width and depth will not be paid in any item.

Bailing out of water should be properly carried out by the contractor at his own cost. Electric, diesel pumps or manual labour can be used for the purpose.

The final bed of the foundation, after the excavation is completed shall be got approved by the contractor from the Consultant or Engineer before the concrete is laid.

#### **PROVIDING AND LAYING C.I. PIPES**

- (a) All the pipes to be taken into use shall be cleaned and brushed clear off rust and painted at both spigot and socket ends.
- (b) Before the pipes are lowered and laid in trenches the contractor shall see that the bedding is plain of the surface is brought to uniform grade and levelled with the help of cross sight rails and boning staff and approved in advance by at least 3 days by the Consultants or Engineers.
- (c) The contractor shall provide and fix and maintain cross sight rails and boning staff wherever required until the time of completion without any extra claim for cost etc. and which shall be considered inclusive in the rates for excavation etc.
- (d) Temporary bench marks shall be provided by the contractor if called upon at a minimum distance of every 30 mtrs. without any claim for extra cost. The bench marks shall be either of stone masonry or mass concrete.
- (e) Materials used for jointing such as hemp etc. shall be got approved in advance from the Consultant or Engineers.
- (f) No jointing operations shall be started unless the grade and levels are approved by the Consultants or Engineers.
- (g) Under no circumstances the C.I. pipes and other water mains will be laid on rock bedding without murum cushioning.
- (h) The murum cushioning of a depth of  $\frac{1}{34}$  the dia mtr. or 15 cm. whichever is greater as specified shall always be provided in all formation with the rate of laying pipe line unless as item for murum bedding is provided for separately in the tender.
- (i) All obstacles such as electric wires, water and sewer main, manholes, natural drainage culverts, storm water drain etc. coming in the way shall carefully be looked after and any damage be prevented to the same. Any work of removing, repairing and re-doing such structures or obstacles in the process of laying pipe lines etc.

should be carried by the contractor without any claim for extra cost unless previously approved by the Consultants or Engineers.

- (j) The contractor shall allow for wastage breakage in cost of pipes at his own cost whenever the item is for providing and laying pipelines.
- (k) Pipes shall be laid in reasonably dry trenches and under no circumstances on slushy murum bedding.
- (l) The contractor shall make own arrangements for the obtaining permission for storing and stacking of pipes etc. on the road from the land owners whether it belongs to any other Govt. Department or Municipal or private land owner.

### **LEADING AND JOINTING**

- (a) All the joining work shall be carried out by the contractor after giving a due intimation in advance and in the presence of Consultant or Engineer.
- (b) Lead joints after having being poured into, shall be chiselled on and caulked to give a tapered shape not a flushed shape.
- (c) All jointing material shall be supplied by the contractor himself and shall be of quality duly approved. The rope used for S/S and collar joints shall be of the best quality, clean hemp or spun yarn, free from dirt and knots and 1/12 inch thicker in dia mtr. than the annular space. The habak paint shall be of approved quality.

### **RUBBER GASKET JOINTS :**

Before assembling the joint the spigot the one pipe and the interior of the socket of the adjacent pipe should be thoroughly cleaned. The gasket should be wiped clean before fixing it in the socket. All care should be taken that the gasket is not twisted while placing in inside the socket, at the same time it fits evenly around the circumference of the socket. The outer surfaces of the gasket should be applied with a thin film of lubricant. The approved quality of lubricant shall be supplied by the contractor at his own cost. The pipe to be joined should be supported centrally by the tackle used for laying and balance just clear of the trench bottom. The spigot of the pipe should be aligned and entered carefully into the adjacent socket until it makes contact with the gasket.

### **JOINTING C.I. FLANGE PIPES & SPECIALS INCLUDING VALVES**

The flanges of the pipes to be jointed shall be got abutting each other keeping required space for inserting rubber insertion of specified size in such a way that bolt holes of both the ends to be jointed come in line with each other. Rubber insertion not less than 5 mm thick shall be 3 ply rubber insertion of specified thickness and of tough, durable and approved quality.

The nuts and bolts to be used shall be standard steel hexagonal nuts of approved quality and shall be of adequate length. Following are the specified sizes :

<u>Diameter of Special</u>	<u>Diameter of Bolt</u>
24 cms. diameter	1.5 cms.
25 cms. to 30 cms. diameter	2.0 cms.
45 cms. and above diameter	2.15 cms.

Steel washers should be used with every nut and bolt. Uneven projection due to casting defects of the flanged shall be removed by filing and made flush with the face of the

flange. In exceptional cases if the holes of the two flanges are not concentric then the contractor shall drill the holes wherever necessary. Rubber insertion of specified thickness shall be cut with outside diameter being equal to that of flange without any projection and shall be exactly circular in shape. The concentric circle equal to the inside diameter of the pipe will then be cut out so as not to protect inside pipe. During cutting care shall be taken not to injure the material of packing.

### **HYDRAULIC TEST**

Every part of the pipe line with special must stand the specified hydraulic test to the satisfaction of the Consultants or Engineers. The hydraulic test pump with the required piping etc. shall be arranged for by the contractor. The contractor shall make his own arrangements for the water required for testing purposes.

If called upon, the contractors have to maintain the pipe full of water until the time of handing over to the Employer.

After the test to the satisfaction of the Consultants or Engineers, the operation of filling the trenches shall be taken in hand only after the written permission of the Consultants or Engineers.

### **SPECIFICATION FOR PROVIDING AND LAYING AND JOINING A.C. / P.V.C. PIPES WITH COUPLERS / C.I.D. JOINTS / SOLVENT CEMENT**

#### **GENERAL**

The item pertains to providing and laying A.C. / P.V.C. pipes of all classes of specified diameter with CID, joint/solvent cement as specified in the item for water supply including collar, socketed bends, socketed tee, socket cross, socket and spigot tapers cap, plug, duck foot bends, excavation, laying pipes and back filling.

This item shall be subject to the general specification.

#### **MATERIALS**

The diameter of the A.C./P.V.C. Pipes specified in the wording of the item shall be the diameter of the bore of the pipes and the pipes shall conform to I.S. 1536-1967 or I.S. 1537-1960. All the fittings (specials) shall conform to I.S. 1538-1960. The pipes and fittings shall have sockets and or spigot as shown in the Drawings, specified in the special provisions or necessary for the work.

#### **EXCAVATION**

Before starting excavation of the trench, sight rails shall be fixed on the alignment of the pipe line at an interval of 30 m. and at every change of grade and direction at a definite and as far as practicable uniform height above the invert of the pipes the centre line being clearly marked on each rail.

The width of the trench shall be at least 30 cm (about 12") wider than the socket of the pipe so as to allow room for ramming the refilled material under and at the sides of the pipe.

The depth shall be such that the pipe shall have a clear cover of at least 75 cm. The trench shall be excavated through all strata met with. When it is necessary and ordered by the Consultant in writing, the sides shall be shored or sloped, otherwise, they shall be as vertical as possible. The rate shall include shoring and provision of slopes.

In case rock is met with, it shall be excavated 15 cm. more than the required depth for providing cushioning by chiselling and line drilling unless blasting is permitted in writing by the consultant. Special precautions shall have to be taken in blasting as ordered by the Consultants.



Dewatering of the trench, if required, shall be done without separate claims. The bed shall be even and to the correct grade and line all cases.

The trench shall be barricaded and warning boards fixed. Red lights shall be hung at night time at sufficiently close intervals to indicate the danger and a Chowkidar employed to see that the lights are properly burning. The contractor shall be solely responsible for any accidents due to any default in barricading, sign posting or red lights and shall bear the consequences.

In case of excavation across a road, permission of road authorities shall be obtained for the excavation of the road surface which shall be made good and restored to the original condition by the contractor at his own cost. At all road crossings, the trench shall be excavated only for half the width of the road and pipe laid. The other half shall be excavated only after backfilling over the laid pipe and marking it suitable for the traffic. At all road crossing, the pipes shall be laid below the crust of the road.

All pipes, cables, service lines etc. met with during the excavation shall be carefully protected and supported. Any damage done be made good by the contractor at his own cost.

### **LAYING**

The pipes shall be laid out along the side of the trench, each pipe in its proper position for laying with an extra pipe after every 20 to allow for cutting if necessary whether the trench crosses a road or place where such distribution is in admissible the pipes shall be stacked in heaps at each end, sufficient to fill in the length. Small pipes below 100 mm diameter may be stacked in heaps at every 30 m.

As far as possible, pipes shall be laid straight in rising or falling gradient. It should be possible to empty the pipe readily and completely.

In case of rock bed, murum bedding of 15 cm. shall be provided before laying pipe. The C.I.D. Joints/Coupler joints shall be made and paid separately. The P.V.C. pipes shall be joined with solvent cement and shall be paid under this item only. At the end of each day's work, the open end shall be suitably plugged.

### **BACK FILLING**

After making the joints, and testing the pipe line to ensure leak proof joints, the trench shall be refilled in layers and manually rammed. The excavated stuff shall be used in filling such that the filling shall correspond to the original nature layers. The fitting shall be kept raised by about 8 cm. per metre of the depth of trench for subsequent settlement. In the case of trench in rock, a bedding and cushioning of murum shall be provided on the sides and top of the pipe. Any surplus excavated stuff shall be disposed off satisfactorily without causing nuisance.

### **ITEM TO INCLUDE**

- 1) Supply of A.C./P.V.C. pipes of specified type and diameter and fittings such as socket, collar, socketed bends, socketed cross, socket and spigot layers, cap and solvent cement for jointing of P.V.C. pipes.
- 2) Excavating trench including laying out, setting up sight rails, ramming soft bed, providing and ramming murum cushioning in rock excavation, shoring, sloping, dewatering if required, protecting and refilling trench, after laying the pipe and making good excavated road surface.
- 3) Laying pipes including cutting where necessary and waste.
- 4) All necessary labour, materials and use of tools and equipment to complete the item satisfactorily.

**MODE OF MEASUREMENT AND PAYMENT**

The contract rate shall be for one metre of pipe laid including all fittings, making up C.I.D./Coupler joint paid for separately. For P.V.C. pipes the item includes joining also. Cutting and waste will not be paid for separately. The length shall be measured net on the straight and curves along the centre line over the pipes and fittings correct upto one cm.

**DRAINAGE SPECIFICATIONS**  
**STONEWARE OR HUME PIPE DRAIN LINE**

The S.W. or Hume Pipes should be of approved Design and of standard quality.

The joints to be made (spigot and socket or collar as the case may be) by dashing 2 or 3 strands of tarred gasket which should be filled afterwards with neat C.M. (1:2) and wiped out clean. The line should be perfectly straight and true to the required grade or slope.

Before filling the excavated trenches, the pipe line should be tested for standard hydraulic test to the entire satisfaction of the Consultants or Engineers. The item includes laying the pipe line on rammed and consolidated foundations jointings, testing and refilling the excavated trenches after completion of work. The trench is to be filled with hard murum for 30 mm. above the pipes and the rest should be filled with ordinary excavated stuff. The trenches to be filled in 2 layers. If any leakage is found it should be immediately removed.

**B.B.MASONRY CHAMBERS**

The chamber shall be excavated to the depth required for the foundation below the invert of the drain pipe, at the site of the pit and shall be of required size. Foundations shall be (1:3:6) C.C. wall to be in 25 cm. brick work in C.M. (1:6) walls and bottom to be internally plastered with a 20 mm thick plaster thickness in cement and sand (1:3) finished with neat cement. At the bottom of each pit, a channel of full width and depth of pipe drain is to be constructed of cement concrete plastered with 25 mm. Coating of cement and sand (1:3). Similar curved channels are to be constructed of cement concrete plastered with 2.54 coating of cement and sand (1:3). Similar curved channels are to be constructed in the pits to be given a gradient of 1 in 30. All cement work to be watered for 15 days after completion.

The rate shall be including excavating, base concreting, B.B.Masonry, inside plastering, fixing of gully trap, fixing of C.I. frame and cover or concrete cover fixing, benching etc. complete. The C.I. frame and cover should be got approved before fixing.

**S.W.SEWER TRAP CHAMBER**

Specifications same as per above Item. The item includes providing and fixing sewer trap of size specified in the memorandum with C.I. frame and cover of required size or precast R.C.C. cover as specified. The cover shall be fixed neatly on the top of chamber in C.M. (1:6). The cover shall be of required weight and size either round or rectangular as required C.I. steps shall be provided in the sewer traps chamber.

**C.I.VENT PIPE**

Providing and fixing 10 cm dia G.I. pipe ventilator with screen cover of mosquito wire gauge, with burnt brick masonry in cement mortar in proportion 1:6. Ventilator includes the construction of cement concrete foundation and pillar of 45 x 45 x 60 cm. as per instructions. The pillar should be plastered on all sides and should be watered for 10 days, 10 cm. dia G.I. pipe of 4.5 meters height should be fitted in the pillar with mosquito gauge at the top end.

**PROVIDING AND LAYING DRAINAGE LINES**

- [1] The sewer shall be to the alignment and gradient shown on the plans and sections and also actually on site. The socket end of pipes shall always face upstream of sewage flow.
- [2] The sewer shall run in perfectly straight lines between manholes as shown on plans.
- [3] The alignment and gradient of each pipe shall be checked by means of boning rod and sight rail and of the invert will be tested by means of straight edge regularly.
- [4] The pipes before being laid shall be thoroughly cleaned, especially at the inside of the pipes.
- [5] No extra rate will be paid for cutting pipes to make up and adjust length in alignment between manholes.
- [6] After sufficient time has been allowed for the joints to set, before filling the trench, the joints of pipes must be proved water tight by filling the pipes with water to the level of 2 metres above the top of the highest pipe in the length to be tested heading the water up for a period of testing. No portion of pipe shall under any circumstances be covered up until inspected and passed by the Consultant or Engineer.
- [7] The water test is made by inserting plug at the lower end of each length and a right angled bend at the top brought into position and made tight with clay. The air bubbles having escaped after the first filling, water is again added to completely fill the pipe. If the water level does not fall more than 13 mm in a length of 8 m. the joints may be regarded as satisfactory. All testing apparatus are to be brought and fixed by the contractor at his costs.

**PROVIDING AND FIXING R.C.C. SADDLE BLOCKS**

R.C.C. Saddle block of size (100 x 60 cm.) clear and 15 cm. thickness and these must be fixed in position and fixed in base in C.M. (1:6). Rate to include providing foundation for these blocks, curing etc. complete. The blocks will have to be cast on site as approved by the Consultants or Engineers. The curing must be constructed and blocks cured for 21 days. The reinforcement will be 12 mm dia at 15 cm. c/c both ways.

**PROVIDING AND FIXING STEEL BARS**

Steel bars should be provided and fixed in position according as required and as per instructions. The payment will be done on M.T. basis.

## LIST OF MATERIAL OF APPROVED BRAND AND / OR MANUFACTURER AND SPECIALISED AGENCIES

NOTE: - Contractors should consider the following BRANDS of Material.

- 1) All materials should be of FIRST QUALITY as produced by the Manufacturer. This is Particularly applicable to glazed and ceramic tiles, paints.
- 2) In case it is established that any brand recommended below is NOT available in the market or its delivery period is too long; then equivalent comparable brands may be used only after approval by the consultants. In such case the contractor shall procure all necessary documents such as catalogues, certificate etc. and or samples to prove their suitability in terms of comparable quality.
- 3) Approved material sample shall be kept in the Materials Bureau on the project site.
- 4) Where specifically called for warranties shall be obtained from the Manufacturer's with seal & signature of the supplier, in favor of the owner and duly handed over.
- 5) The variation in the market prices between several brands of the same material shall have NO impact or bearing on the item rate quoted by the contractor in the tender. The alternatives are given merely to accommodate the selection & purchase as per availability.

1.	CEMENT	:- ULTRATECH ,AMBUJA, MANIKGARH (43/53 GRADE OPC)
2.	STEEL ,MITTAL	:- TATA/ STEEL AUTHORITY OF INDIA
3.	WATERPROFING COMPOUND	:- Dr. FIXIT, SIKKA, FOSROC.
4.	NEERU	:- SURYA-KIRAN
5.	VITRIFIED TILES	:- JOHNSON, ASIAN, CITI TILES
6.	GLAZED TILES	:- JOHNSON, KAJARIA,
7.	PAINT	:- ASIAN, NEROLAC,ICI
8.	DOORSHUTTER	:- JET, GEM, TOWER, CENTURY
9.	LAMINATE	:- GREENLAM, MERINO
10.	ALLUMINIUM SECTION	:- JINDAL, INDAL
11.	GLASS	:- SAINT-GOBAIN, MODI-FLOAT
12.	STONE KERBS	:-K.K MAKE
13.	R.C.C PIPES	:- HIMALAYA ( NP-2 class)
14.	CERAMIC TILES	:- KAJARIA, REGENCY, NITCO, BELL

- |     |                        |                                    |
|-----|------------------------|------------------------------------|
| 15. | PRECOATED SHEETS       | :- TATA, GANGA (0.5 mm , 26 guage) |
| 16. | BITUMINOUS BOARD       | :- SHALIMAR                        |
| 17. | HARDWARE DOOR FITTINGS | :- SOLO, MAGNUM                    |
| 18. | LOCKS                  | :- GODREJ, EUROPA,                 |

**BASIC PRICES / ESCALATION CLAUSES**

The item rates shall be based on the ex-site prices of:

- |    |           |                |
|----|-----------|----------------|
| 1. | Cement    | Rs. /- per bag |
| 2. | Tor Steel | Rs. /- per MT  |

The above basic prices shall hold good for the period of the contract. The unit prices will be varied only to extent of the variation in the above materials only. Contractor profit over to the escalation in the prices will not be admissible. The escalation will be admitted only on the Consultant's assessment and acceptance of the claim. The contractor shall submit the original receipt of materials purchased when required to do so.

CONTRACTOR

**TECHNICAL  
SPECIFICATION  
PLUMBING WORK**

**1.0 GENERAL SPECIFICATIONS FOR THE PLUMBING & SANITATION:****1.1 COMPLETENESS OF CONTRACT:**

- 1.1.1 If there is any description between specification BOQ, drawings, more straight would be allow.
- 1.1.2 Contractor shall be deemed to have carefully examined the specifications, general conditions and tender drawings, etc. and to have fully assessed and have satisfied himself as to the nature and character of the work to be executed, site conditions and other relevant matters and details.
- 1.1.3 Contractor shall provide all item whether specifically mentioned or not but which are usual or require to make a complete working system and ensure safe and satisfactory operation, apparatus, appliances, with the intent or purpose of these specifications. In case of doubt or doubts, the tenderer shall clearly point out his understanding of the specifications, before award of contract.
- 1.1.4 Contractor shall study the site conditions before tendering and shall satisfy himself before submitting his Tender as to the nature of the ground and subsoil, form and nature of the site, the hydrological, climatic and physical conditions at the site the quantities and nature of the work and the materials necessary for the completion of the work, the means of access to the site, the proneness of site to floods as found in the past also the accommodation required by him, and in general, shall himself obtain all necessary information as to the risks, contingencies, and other circumstances, which may influence of affect his Tender. The contractor has to include for all requirements such as scaffolding, making opening, grouting, welding jointing materials, gaskets, nuts & bolts, screws, paintings, including making good the opening and chases in walls, slabs, etc. in the price quoted.
- 1.1.5 Unless otherwise agreed in writing, the specifications, drawings and general conditions etc. form the contract documents and all clauses and conditions specified by the contractor stands null and void.
- 1.1.6 The quantities mentioned hereinafter are approximate and subject to variation without violating the contract.
- 1.1.7 Contractor has to provide special fittings like safety valves, pressure gauges etc, as necessary and should specify the Brand names and rating offered as part of the prices quoted.

**1.2 REFERENCES:**

- 1.2.1 References to standards, codes, specifications, recommendations shall mean the latest edition of such publications adopted and published at date of invitation to submit proposals.

**1.3 DRAWINGS AND LITERATURE :**

- 1.3.1 Before proceeding with the work, the Contractor shall submit for approval general layout and working drawings as are necessary to demonstrate fully that all parts of the materials to be furnished will conform to the specifications.
- 1.3.2 Within 30 days of acceptance of the Tender, the Contractor shall furnish three (3) prints of layout, assembly and erection drawings for approval. If any modifications are proposed by the Owner/Consultant, three further prints of the modified drawings shall be submitted. No modifications shall be made in a drawing after it has been approved by the Consultant / Owner, without prior consent.
- 1.3.3 Approval by the Owner / Consultant of the drawings shall not relieve the Contractor of any part of his obligation to meet all the requirements of the Contract or the responsibility for and

pay for all alterations to the works due to discrepancies or omissions in the drawings or other particulars supplied by him, whether such drawings have been approved or not.

- 1.3.4 After execution of works, contractors shall furnish a set of original tracings of as-built drawings incorporating the modifications if any during execution.

#### **1.4 INSPECTION & TESTING – AT CONTRACTOR’S PREMISES :**

- 1.4.1 Owner or its authorized representatives shall have full power to inspect drawings of any portion of the work or examine the materials and workmanship of the plant at the Contractor’s works or at any place from which the material is obtained. Acceptance of any material proves satisfactory but shall have to be paid by the Contractor in case the material or work is found defective or of inferior quality.

#### **1.5 MATERIAL AVAILABILITY:**

- 1.5.1 In case of non-availability of any particular material the Contractor shall procure next best available material and install the same at no extra cost to the owner, after written approval of the Owner through the consultant. Final decision on same would be taken by owner.

- 1.5.2 Materials & Samples- The materials / products used on the works shall be one of the approved make / brands out of list of manufacturers / brands / makes given in the tender document. The contractor shall submit sample / specimens out of approved makes of materials / products to the project manager for prior approval. In exceptional circumstances, project manager may allow alternate makes / brands of products / materials at his sole discretion. The final choice of brand / make shall remain with the project manager whose decision shall be final & binding and nothing extra on this account shall be payable to the contractor.

#### **2.0 BASIS OF TENDERING:**

- 2.1 The tender shall be complete covering the entire work of system and ancillary services including all building system and outside utilities as shown and specified.

- 2.2 The contractor shall consult specification, drawings and the schedule of quantities which gives an idea of these systems.

#### **3.0 DRAWING:**

- 3.1 The drawing accompanying these specifications are design drawings and generally are schematic. They do not show every offset, To cross Y’s junction coupling/Flanges/ disconnection arrangements/ etc. which are required for installation in the space provided. The Contractor shall follow the drawings, as closely as is practicable and install additional bend, elbows or junctions, etc, where required to suit local site conditions, from actual site measurement taken, subject to approval and without additional cost to the Owner. The Consultant reserves the right to make any reasonable change in outlet location prior to roughing in. All connection and appurtenances, shown in the various diagrams, shall be included in the finished job

- 3.2 It shall be the Contractor’s responsibility to co-ordinate with all other agencies at site, for proper and adequate installation clearance.



**4.0 ORDINANCE, CODE & REGULATIONS**

- 4.1 It shall be the Contractor's responsibility to provide complete system, as indicated as and as required by applicable code. All clarifications and modifications, which have to be cleared with the appropriate, shall be carried out without additional cost, to Owner. Unless otherwise approved, the product shall bear the mark of approval of Indian standards, as required, the government bodies, code and ordinances of local authorities whose permissions are required for occupation of the building on completion.

**5.0 UPVC PIPES FOR SEWAGE SYSTEM****5.1 SOIL, WASTE, VENT AND ANTI SIPHONAGE PIPES & FITTING :**

All soil, waste, rain water pipes vent & anti siphon pipes or within plumbing shafts, vertical run shall be SWR UPVC of class B type conforming to IS No 13592. All UPVC pipes & fittings shall be of best approved make. The pipes should be of uniform thickness and they shall not be brittle but withstand for weather conditions. The fittings shall be of standard thickness. The pipes shall be installed and fixed securely to the wall with UPVC saddles away from wall and also should have threaded door cap for inspection incase of removal of chocked waste matter. The jointing of pipes & fittings should be with rubber rings for vertical and solvent cement for horizontal.

The support brackets and hangers and other supports, their spacing shall be as described under point no 8.

Also pipelines and fixtures in sunken portion should be properly encased at the locations and intervals as per requirements and as directed by Engineer in Charge / Project Manager.

All soil pipes shall be extended at east 300 mm above parapet top.

**5.2 MATERIAL AND FIXING\_\_**

All soil, waste and anti-siphon pipes and fittings used within sunken floor areas or within plumbing shafts vertical run, shall be of the best approved Indian make of quality truly cylindrical and of uniform thickness. They shall not be brittle but shall allow for heavy cutting, and drilling, and shall not be less than diameter, mentioned in the schedule of quantities and shall be fixed away from the wall on special saddles. It will protect the brick wall from any leakage from vertical pipes.

**5.3 JOINTS:**

Jointing shall be carried out with rubber rings or solvent cement. The spigot of the pipe must be forced well home into socket and must be entered so that the joint may be of even thickness all rounding.

- 5.4 Inspection chambers, gully traps, etc. within the building shall be of Patel Pattern requirement, if so specified.
- 5.5 Supports, pedestals, and base for inspection chambers, gully traps and pipes shall be in 1:3:6 cement mix.
- 5.6 Pipe sleeves and insert, etc. through RCC walls either external or internal shall be of G.I or M.S., provided with water bar flange or as per the details given in drawing.

5.7 During installation opening of pipe shall be plugged with wood cut into required shape and wrapped with gunny bags and maintained free from dirt getting in.

5.8 The size of branch waste for difference fittings shall be as follows:

Lavatory Basin	40 mm (1 ½)"
Urinal	40 mm (1 ½)"
Sink	40 mm (1 ½)"
Nahani trap	80 mm (3")
Special floor trap	80 or 100 mm as required with Grating as specified.

5.9 Rainwater flushing shall be made as per details with rectangular shape grating and extension piece as specified.

5.10 All roof drain pipes and fittings shall be SWR UPVC of class A type conforming to I.S. **13592**. This shall apply to pipes outside building or within the building or inside separate shafts.

5.11 The floor traps for toilet blocks shall be PVC with stainless steel grating, and traps shall have ISI stamping.

5.12 Bathroom C.P. grating shall be of boiled down design out of heavy cast brass with the chromium plating of the best approved standard.

5.13 The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning.

5.14 Floor traps shall be provided with 75 mm dia. Puff pipe where the length of the waste is more than 1.80 meter or the floor trap is connected to waste stack through bends. These Puff pipe connections shall not be measured separately and shall be deemed to have been allowed for, while quoting.

5.15 The waste from lavatories kitchen, basins, sinks, baths and other floor traps shall be separately connected to respective waste stack of upper floors. The waste stack of lavatories will be connected directly to manhole while the waste stack of others shall be separately discharged over gully trap.

5.16 The cost of fittings is to be covered under rate of pipe and hence payment will be made considering linear measurement of pipe only in Meter.

5.17 Hydrostatic Test

- 1 The purpose of this test is to locate any leaks at the joints and correct them prior to putting system into operation It is important to Visually inspect the joints.

- 2 To isolate each floor or section being tested, test plugs are inserted through test fittings in the stack. All other opening should be plugged or capped with test caps. Fill the system to be tested with water at the highest point. All entrapped air in the system should be expelled.
- 3 Hydrostatic pressure of  $0.5\text{kg/cm}^2$  (5M) should be applied. Fifteen minutes is suitable time for the test.
- 4 Once the stack is filled to desired level of water column, a visual inspection of the section being tested should be made to check the leaks.
- 5 If the leak is found, it should be removed and section retested.

## **6.0 C.P.V.C & U.P.V.C. PIPES & FITTINGS:**

- 6.1 All supply pipes shall be of approved make of I.S. quality or equivalent to the requirements of the local authorities or as specified in the schedule and conforming to IS.

The support brackets and hangers and other supports, their spacing shall be as described under point no 8.

- 6.2 The joints shall be distributed in strict conformity with regulations. They shall be away from of the wall surface by at least 50 mm by means of support stand/ saddles. All control valves, stop cocks, ball valves; bib-cocks shall be of the best approved quality procurable of heavy cast drawn brass. All branches shall have individual control arrangements with full way valves, to enable regulations and cut off as required. They shall be of best Indian manufacture specified in the Schedule of quantities and of stampings and bear I.S.I. markings. All fittings shall be of approved quality make.

- 6.2.1 The water tightness of joints shall be assured by approved methods of jointing material

- 6.2.2 Approved Solvent Cement shall be used to make water tight joints.

## **6.3 INTERNAL WORK**

For internal work C.P.V.C.(SDR – 11) pipes and fittings outside the walls shall be fixed either visible by means of approved pattern holder-bat clamps, keeping the pipe clear off the plastered wall by 15 mm for cold water and 15 mm for hot water. Wherever indicated on the drawings or as directed by the Consultants, chasing of walls shall be done to embed pipes. regulation and National Building Code. All embedded hot water pipes are to be painted and coated and wrapped as above and then wrapped with three ply asbestos twine wrapped tightly around the pipe.

- 6.4 Alternative Materials:

In case the CPVC pipes are changed to G.I. / Kitec pipes if desired by the owner / employer the work is to be executed all as per manufacturer's specifications and in workmanlike manner.

#### 6.5 TESTING:

All CPVC / G.I. Pipes and fittings are to be tested to a pressure of 125% of its designed working pressure one hour to ensure that pipes have proper joint and that proper materials have been used in jointing. All leaky joints must be made leak proof by redoing at Contractors expense.

6.6 All water fittings shall be of approved make and shall in all respects comply with the latest Indian Standard Specification I.S. The brass fittings shall be fixed in the pipe line in a workman like manner. Care shall be taken to see that joints shall sustain the above Hydraulic Test. The defective fittings and the joints shall be repaired, redone or replaced at Contractors expense.

6.7 Whenever a CPVC pipe crosses a floor, then a CPVC sleeve with the floor should be provided .On no account should lime or lime concrete come in direct contact with CPVC pipe and fittings. This important condition shall not be waived under any circumstances.

6.8 The cost of fittings, Brass fittings for connection of Valves, and other CP fittings is to be covered under rate of pipe and hence payment will be made considering linear measurement of pipe only in Meter.

No extra payment for any type of fitting will be made.

### 7 SANITARY FITTINGS:

All sanitary fittings shall be specified in Schedule of Quantities and approved by the Consultants / Owner. The same may also be procured by the Owner and issued for fixing, if so desired.

#### 14.1 7.1 GENERAL

All setting and bedding of sanitary fittings shall be done carefully to suit the required levels. Mortar drops, paint slashes etc. shall be removed from fittings, walls and floor immediately before these get dry.

#### 7.2 WOODEN PLUGS

The plugs shall be of hard wood and of size 50 mm x 38 mm at top and of length 50mm. These shall be fixed on wall in cement mortar 1:3 (1 cement: 3 sand), after the plugs are fixed in the wall the mortar shall be cured till it is set

### 7.3 WALL HUNG WATER CLOSETS :

Wall hung Box Rim Closets having back inlet and 'P' trap outlet shall be fixed on appropriate C.I. or M.S. brackets of suitable design to suit the thickness of toilet walls and ensure that the chair is self supporting and Independent of the wall.

### 14.4 7.4 PLASTIC SEAT AND COVER:

The seat shall be fixed to the pan by means of two 8 mm dia. corrosion resistant C.P. hinge bolts with a minimum length of shank of 65 mm and threaded to within 15 mm of the head. Each bolt shall be provided with two suitably shaped washers of rubber or other similar material for adjusting the level of the seat while fixing it to the closet. In addition one 8 mm non-ferrous metal of the washer shall be provided with each bolt. The maximum external diameter of the washers fixed on the underside of the pan shall not be greater than 25 mm. One arm of the hinge shall be fixed to the under side of the cover flush with the surface by means of 3 nos. 10 mm long C.P. screws.

### 7.5 BOWL PATTERN LIP URINALS:

Urinals shall be fixed in position by using screws, and shall be at a height of 65 cm from the floor level to the lip of urinal, unless otherwise directed. The wooden plugs shall be fixed in the wall in cement mortar 1:3 (1 cement: 3 fine sand). Each urinal shall be connected to waste pipe which shall discharge into the channel or floor trap. The connection between the urinal and flush or waste pipe shall be made by means or heavy type PVC trap which will not be affected by Uric Acid.

7.5.1 All urinal pans will have flushing system of approved type and make as approved by the Client / consultants.

7.5.2 All connections shall be made leak proof.

14.6. 7.5.3 At specific instances semistall, full stall or squatting slab urinals may be specified in the schedule and / or drawings.

Semistall urinal pans should have approved type concealed chair brackets and accessories as demanded. The bottle traps should be made of PVC/HDPE extruded section to be free from action of acid etc. The fixing of the units shall be as per manufacturer's instruction.

7.5.4 Spreaders, inlet, outlet connection shall be prepared to actual site measurements, to ensure proper verticality and elegance. These shall be full bore and shall not form any dents.

### 7.6 WASH BASIN

The basin shall be supported on a part of concealed C.I. brackets fixed in cement mortar, 1.3 (1 cement : coarse sand). The C.I. brackets shall conform to I.S.775. The wall plaster on the rear shall be cut to rest over the top edge of the basin. After fixing the basin, plaster shall be made good and surface finished matching with the existing one. The C.P. brass trap and union shall be connected to 40 mm dia. waste pipe which shall be suitably bent towards the wall and shall discharge direct into the floor trap. The height of the front edge of the wash basin from the floor level shall be 80 cm.

#### 7.7 PANTRY SINK

C.P. brass trap and union shall be connected to 40 mm nominal bore waste pipe instead of 32 mm nominal bore which shall suitably bend towards the wall.

- 7.8 The description in the bill of quantities is an indication of the style of plumbing unit required. The specialist plumber shall provide all the necessary plumbing hardware required for the specific type of unit and the quoted will provide for all contingent accessories, if not detailed, but are required for the functioning of the units.

Positioning of the units shall be planned with reference to the lines as a grid pattern so that all fixtures shall be tiles junctions and not in the tile surface. Connecting pipe shall be suitably ordered. The owners reserve right to procure the Sanitary pottery ware directly from approve source and the cost incurred will be recovered from the quoted while making payment. The material will be in the custody of the contractor, thereafter till commissioning.

- 7.9 All chromium plated pipe section, shall be of extruded heavily plated, and shall not peel off or fade out due to use.

- 7.10 Defects noticed in the fittings during the extended maintenance period due to latent / patent shortcomings in quality manufacture or workmanship shall be replaced free of charge.

- 7.11 The short length of pipe connections to sanitary pottery ware exposed on wall shall be of full bore C.P brass pipe made actual measurement taken at site to suit locations as per detailed instructions and interior drawings.

Pipe with dents / deformation made to standard fittings available in the market shall not be placed on works.

- 7.12 Material used on urinal waste connection shall not form a discoloration

- 7.13 Disconnecting please, nipples etc, required for C.P connections, inlet / outlet caps to unit etc, shall be inclusive the rate quoted and shall not be considered for extra payment.

- 7.14 The test to guarantee the quality of fixtures and their connections to the system shall be performed by the contractor after installation.

## 8.0 HANGERS AND SUPPORTS

### 8.1 GENERAL:

Provide proper solid angle iron / channel section, supports for all pipes complete with clamps, provide wooden guide to support pipe on the angle iron/hanger supports, in general where a bunch / slabs to facilitate welding of angle iron supports. For attachment in concrete, use "Dash" fasteners or Anchor plug type inserts or equivalent. Provide hangers within 1 meter of all change in direction of mains and a minimum of three hangers per expansion bend. Provide all additional structural steel angles, channels or other members not specifically shown but are required for proper support.

8.2 Where necessary additional hangers to be provided to arrest hammers or hydraulic with proper rubber.

8.3 Space hangers as noted below except of all soil pipe which shall have a hanger of multiple fittings, sufficient hangers shall be provided maintain proper slope without sagging, in cast of angle. Suspended line, the following is suggested.

A)

**PIPE MATERIAL SPACING AND SUPPORTS**

MATERIAL	NOMINAL PIPE SIZE	HORIZONTAL (M)	VERTICAL (M)
<b>P.V.C.</b>	15	0.6	2.4
	20	0.6	3.0
	25	0.6	3.0
	32	1.2	3.0
	40	1.2	3.0
	50	1.2	3.0
	65	1.2	3.0
	80	1.2	3.0
	100	1.2	3.0
	150	1.4	3.0
<b>C.P.V.C.</b>	15	0.5	1.0
	20	0.5	1.0
	25	0.5	1.0
	32	0.8	1.4
	40	0.8	2.0
	50	1.2	2.2
	65	1.5	2.2
	80	1.5	2.4
	100	1.8	2.4
	150	1.8	2.4

\* **Note:** This is as referred in uniform Plumbing code .But in case the manufacturer recommends less spacing than above, the same will be applicable.

8.4 Provide floor stands, wall brackets of masonry piers, etc. for all lines running near the floor or near walls so that those lines, near concrete or masonry

walls may hung also by hangers carried from wall brackets at a higher level than pipe. Hanging of lone pipe from another is prohibited.

## **9.0 VALVES AND PRESSURE GAUGES:**

- 9.1 Pressure gauges shall have not less than 115 mm dia 10 mm gas threads, brass body; siphon and gauge cock of 10 mm size, Dial ranges shall be adequate for the pressure encountered and as specified.
- 9.2 Provide valve on branch pipe connection to equipment where indicated. Valves are to be located for easy access and are to be full bore of pipe connected together. Support all valves wherever necessary. The Valves should be tested and approved by local authorities as per Byelaws in force.
- 9.3 Valves shall be tagged with permanent label under hand wheel indicating type and duty.
- 9.4 Where indicated and specified, angle pattern stopcocks, at each hot and cold water inlet be provided. They should be Anti-scaling pattern same as faucets of approved manufacture.
- 9.5 Strainers: C.I. pot strainer with G.M. mesh screen in perforated brass strainer body of approved manufacture with a cock for blowing down. Screening area of strainer shall be minimum of 5 times more than pipe area, with 1 mm maximum size holes.
- 9.6 All tapping from distributors from main feeder shall have isolation valves in shafts, to ensure proper facility for maintenance and minimize the area of cut off during repairs.

## **10.0 CUTTING, PATCHING, REPAIRING AND MAKING GOOD**

- 10.1 Cutting, Patching and repairing required for the proper installation and completion of the work, specified in each division, including chasing plastering, masonry work, concrete work etc. and making good shall be carried out by the contractor wherever required. Holes which are oversize shall be refilled, so that a tight fit is obtained around the pipe or other object passing through.

Any damage to water proofed location should not be patched up without rectification by the water proofing agency (specialist contractor) to ensure his guarantee.

Indiscriminate cutting and patching work should be avoided by proper coordinate planning the sleeves etc. while works of other agencies are in progress.

## **11.0 EQUIPMENT PROTECTION**



11.1 All pipe and conduit openings shall be kept closed by means of plugs or caps to prevent the entrance of foreign matter. All piping conduit, fixtures, equipment or apparatus shall be protected from damages. Any item damaged prior to final completion of work shall be restored to its original conditions or replaced at no expense to the Employer.

11.2 Accessibility: The installation of Valves, thermometers, clean out fittings another indicating equipment or specialties requiring frequent reading, adjustment, inspections, repairs, removal or replacement, shall be conveniently and accessibly located. Thermometers and gauges shall be installed so as to be easily read from the floor.

11.3 Inserts and Sleeves

A) GENERAL

In advance of placing of concrete slabs or construction of walls, furnish location of Inserts and sleeves necessary as a result of this operation shall be at no expense to the Owner. Opening shall be made as per Structural Consultant's approval.

B) PIPE SLEEVES:

1) WALL SLEEVES:

C.I or M.S. black pipe wall sleeves in cold store and pipe for cable, conduits, gas pipes, etc are to be inside flush with wall on both sides. Sleeves shall be large enough in diameter to provide 15 mm clearance around pipe for insulation Exterior wall sleeves for cable entry / pipe / earthing strips, etc. shall be flush with wall on both sides. Sleeves shall be large enough to allow caulking from outside using lead wool.

2) FLOOR SLEEVES:

Interior floor sleeves shall be of C.I. extending 50 mm more above finished floor. All pipes passing through sleeves shall be caulked with asbestos rope and finished with cement mortar, insulation butted to floor sleeves and sealed with insulating cement on both sides.

Interior floor sleeves for pantry areas shall be G.I. steel pipe extending 50 mm above finished floor. Caulking shall be the same for general areas.

Note: floor on grade sleeves shall be the same as exterior wall sleeves, caulked and made water tight.

**12.0 EQUIPMENT, MATERIAL AND WORKMANSHIP:**

12.1 Each piece of equipment shall meet the detailed requirements of the contract documents and suitable for the installation shown. Equipment not meeting all requirements will not be provided, even though specified along with other manufactures, in the list of approved makes.

12.2 Where two or more units of the same class are furnished, product of the same manufacture has similarity and easy replacement of spares. Furnish all materials and equipment, new and free from defects and of size, make, type, and quality here in specified or approved by the Consultant. All shall be installed in a neat and workmanlike manner.

### **13.0 CLEANING OPERATION AND TESTS:**

13.1 Plumbing Equipment fixtures, piping etc. shall be free of stamping, marking (except those required by codes). Iron cuttings and other foreign material.

13.2 Water systems shall be cleaned thoroughly filled and flushed with water.

13.3 The entire mechanical apparatus shall operate at full capacity without objectionable noise or vibration.

13.4 The system has to be periodically given the tests specified in the presence of site Engineer and the client's representatives as herein specified.

All test equipment, accessories, materials and labour necessary for conducting the test and for inspection and repair work shall be arranged well in advance of the test date.

After shortcomings are repaired or defective items replaced the tests will be repeated until the entire system is found satisfactory. If the local regulations insist on similar tests in the presence of approving authorities, the same shall be complied with and acceptance from the authorities lodged with the Consultants / Employers.

13.5 The entire system of soil, waste and vent piping to be tested with water after the roughing –in is completed and before the fixtures are set. After setting the fixtures, provide smoke tests, after sealing all traps.

13.6 Water Tests:

Test entire system or sections, of system by closing all opening in piping except the highest opening and filling system with water to the point of overflow, if the system is tested in sections, plug each opening except the highest opening of the section filled with water. Keeps the water in system or in the specific section under test for at least 45 minutes before inspection starts with test pressure/ head lasting for two hours. The system must be free from leakage and defect at all joints.

13.7 Test all down spouts or rain headers and their branches within the building by water as described for the above soil, waste and vent system.

13.8 All Water Piping: Hydro –static test at 125% of its designed working pressure for a minimum of one hour without drop in pressure as required.

13.10 All systems shall be tested in sections as required to expedite the work of other trades and meet construction schedules and final test on completion.

13.11 On completion of the works, the following tests shall be performed to the satisfaction of the consultants/clients representatives to enable them issue of Virtual Completion.

- a) a. Hydraulic test
- b. Tests for anti-siphon system
- d) c. Pump rating and output.
- e) d. Inspection of all units and fixtures

13.12 The Contractor shall arrange on his own initiative for similar tests during the progress of works to ensure that there are non defects in material/workmanship in portions of work to be concealed or embedded under the floor in felling.

a) a. **HYDRAULIC TEST:**

1. Suitable section as directed by the Engineer-in-charge shall be taken for such testing from time to time during progress of the work and satisfactory test given for that section. All testing apparatus, gauges, connections etc. and water required for testing shall be arranged by the Contractor at his cost. Owner does not undertake any responsibility to supply water for testing, which the Contractor has to arrange from the Municipality / M.I.D.C. or otherwise by paying the required charges directly. The owner shall have the right to recover such charges from his bills if complaint are received that Contractor has not paid the charges thereof.
2. Satisfactory hydraulic test shall be regarded when the section under test shall withstand the pressure as specified by the Engineer-in-charge for about ONE Hour without operating the test pump, the test pressure being maintained at the specified figures during that ONE Hour interval.
3. The entire pipe line, specials and all joints in that section appear to be dry.

During testing if any joints are found leaky they shall be repaired and/or redone by the Contractor at his cost till the test is found satisfactory. Similarly, any pipes, collars, specials, show hair cracks, leaks, etc. during testing, the Contractor shall replace them with sound pipes and specials together with new joints, entirely at his own cost, till a satisfactory test is given. The pipe specials, etc. which crack during testing will, however, be supplied by the Contractor for replacement free for cost. The hydraulic test shall be given in presence of the Engineer-in-Charge.

14.0 **EQUIPMENT & PIPING IDENTIFICATION;**

21.1

14.1 Pipe Markers: Each piping systems shall be provided with a nameplate properly clamped or stenciled. Letters are to be 10 mm if 3 meter above the floor and 50 mm minimum if below that height. Nameplates on parallel group's pipes etc. shall be neatly lined up. Wording of lettering shall correspond to the equipment designation used in piping legend and shall be as approved. Name plated to be of GI. Sheets (gauge 20 SWG on 25 x 25 angle) secured on to sheet metal and angle iron to be welded on main pipe. In case of insulated pipe the 25 x 25 mm angle bracket should be projecting beyond insulation thickness.

**14.2 VALVE REGISTER:**

To be submitted in triplicate along with location and identification number in final drawing to be furnished by contractor.

**15.0 MODE OF MEASUREMENT:**

15.1 All work shall be measured net in decimal system, as fixed in its place, subject to the tolerance given below, unless otherwise stated:-

- a) Dimensions shall be measured to the nearest 0.01 meter.
- b) Areas shall be worked out to the nearest 0.01 Sq. meter.  
All measurements of cutting shall, unless otherwise stated, be held to the consequent waste.

15.2 All PVC pipes, such as soil, waste, vent and CPVC, UPVC & G.I. Pipes shall be measured in linear lengths along the center line, as completed. The rates shall include all joints and clamps etc. as specified in the respective items.

15.3 All fullway valves, ball valves, non-return valves, sluice valves etc. shall be measured in number after excluding them from liner measurement.

15.4 The diameters of pipes and fittings mentioned in the specifications are the inside diameter in all cases unless otherwise stated.(as in case of P.V.C.pipes)

**16.0 TOOLS AND MATERIAL AND STORAGE:**

- a) The Contractor at his own cost and charge shall provide all materials, tools, tackles, measure, scaffolding, labour and water necessary for the completion of the whole work in all respects.
- b) The Contractor shall pay the fees for testing the material to local authorities, or other statutory authorities.
- c) The Contractor will obtain from time to time various permissions, and the completion certificates as per rules of all local and statutory authorities.
- d) The Contractor shall arrange for the material and storage facility with the Building Contractor.
- e) Any material, brought at site, shall not be removed without the written authority of the Consultants and owner when the contractors shall have received payment in respect of any certificate in which it is stated that the value of any unfixed materials on the work has been taken into account; such materials shall become the property of owner and the Contractor shall be liable for any loss or damage there to.

- f) The Contractor shall insure the work against damages, for such sum as the owner may direct from time to time. All Insurance Policies are to be taken out in the joint name of owner and the Contractor in an office selected by the owner and all policies and receipts shall be deposited with the owner.
- g) All the brackets and hangers for pipe shall be fixed to the wall or RCC slab using 'Dash' fasteners, wherever necessary. Exposing reinforcement bars for hooking will not be permitted.
- h) Surplus material from the site shall be carted away by the Contractor without any cost to the owner and the storage space provided to the Contractor shall be handed over to the owner clean and ready for occupation, free from all encumbrances.

### 17.0 GENERAL SERVICES:

The Contractor shall pay the fees for testing the materials by the Municipal Corporation.

The Contractor will process and arrange from time to time various permissions and obtain the drainage completion certificate and adequate water supply Certificate under the rules of the local authorities.

### 18.0 BUREAU OF STANDARDS, COLOUR CODE :

In industrial and multidisciplinary installation like Hotels and Hospitals, additional item may be added for other systems.

To indicate the class of its contents, each pipe and appurtenances connected therewith shall be marked as under.

1	Water Drinking	-	Sea Green
2	Non Potable Water	-	Orange
3	Treated Effluent	-	Admiralty Blue

Charts showing the colours for primary identifications should be displayed at points where they are likely to be needed for references.

## **LIST OF APPROVED MAKES**

**1.0 LIST OF APPROVED MAKES**

1.	R.C.NP2Pipes	Local Make
2.	Eco Drain (PVC Pipe) for External Drainage	Supreme/D-rex/Astral
3.	G.I. Pipes Heavy Grade as per IS 1239	Tata, Zenith, Siddharth
4.	CPVC / UPVC pipe	Astral / Prince / Supreme
5.	Gun Metal valve & fittings	Leader, Audco, TBS
6.	PVC Valve	Astral / Prince / Supreme
7.	Float / Equilibrium Valves	Prayag
8.	Pressure Gauges	Flgt, H Guru, pricol
9.	SMP pipe	Neco
10.	RCC Manhole cover	Make-nico , Pratibha

**SECTION****MODE OF MEASUREMENT**

In general the mode of measurements shall be as per standard practice laid down by the IS: 1200-1964 read with latest amendments, if any except where it differs from that stated in the specifications, in which case, the mode of measurements as mentioned in the specifications shall prevail.

CONTRACTOR

## PRICE BID

SATPUR BRANCH BUILDING at MIDC Satpur , Nashik.  
BANK OF MAHARASHTRA

Sr. No.	Particular	Amount
1	Basic building work	
2	Other work	
a	Under ground - 50,000Lit with all require plumbing and pumping arrangement , level indicator . -	
b	RCC Septic tank size -5.1 x2.0 X 1.80 mtr and soak pit size -for 50 user	
c	Coloured Paver block 80 mm thick with RCC curb wall 300 mm depth along all peripheral margin. Quantity – 280 sq.mtr .	
d	<b>Demolition of old building and all scrap will be contractor's property and all material will be disposed or carting away by contractor on his own risk.</b>	
e	ACP and glass curtaining work with require fabrication	

**Total –**

**Note** - Rate to be quoted are inclusive of all taxes including LBT , VAT , S. tax , Pf, ESIC, royalty etc. etc. No extra payment against any head, i.e. rate should be inclusive of all .

**This is C form tender , Please collect and attached herewith the details Architectural and structural drawings from consultant before quoting the rates .**

**Declaration-** I have read all terms and conditions and details of entire tender documents including drawing and design.

VAT registration no. -

Service tax registration no-

LBT registration no.

- Name of contractor-
- Address –
- email-
- contract person-
- Contact no.-
- Sign with seal -



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