

GOVERNMENT OF MADHYA PRADESH

URBAN DEVELOPMENT & HOUSING DEPARTMENT



INTEGRATED STANDARD SCHEDULE OF RATES

[VOLUME – 1]

WATER SUPPLY, SEWERAGE AND TUBE WELL WORKS



EFFECTIVE FROM - 2nd August 2021

DIRECTORATE
URBAN ADMINISTRATION AND DEVELOPMENT
PALIKA BHAWAN, SHIVAJI NAGAR, NEAR 6 No. STOP
BHOPAL, MADHYA PRADESH 462016

PREFACE

Directorate, Urban Administration and Development under Urban Development and Housing Department, Government of Madhya Pradesh is the State Headquarter for the Urban Local Bodies of the state. Urban Local Bodies undertake various Infrastructure Works such as Water Supply, Sewerage, Tube Well, Building Works, Road Construction, Bridge, Culvert Construction and Electrical works from time to time. An Integrated Standard Schedule of Rates (ISSR) in 4 volumes for (i) Water Supply, Sewerage and Tube well works (ii) Building Works (iii) Road and Bridge Works (iv) Electrical works was issued by the Directorate, Urban Administration and Development, Bhopal on 01st June 2011 and the same was revised on 10th May 2012.

With the increase in Labour and Commodity Rates, implementation of Integrated Taxation, Goods and Services Tax (GST) and prevalence of new useful products in the market, it has become important to revise the Integrated Standard Schedule of Rates.

Due care has been taken to frame this Integrated Standard Schedule of Rates as correctly as possible. It is, however, possible that some errors might have crept in. In case any error or omission is noticed, the same may be brought to the notice of this office.

Effective suggestion for any correction, addition & alteration is always welcome for any further betterment to this schedule of Rates for Water Supply, Sewerage and Tube well works, Building works, Road and Bridge works and Electrical works.

This Integrated Standard Schedule of Rates is available on the departmental website www.mpurban.gov.in and shall be effective from 02-08-2021.

Bhopal, 02nd August 2021



(G.P. Katare)

Engineer-in-chief

Urban Administration & Development
Madhya Pradesh, Bhopal

MEMBERS OF WORKING COMMITTEE

1. Mr. G.P. Katare, Engineer-in-Chief, Directorate Urban Administration and Development. Chairman
2. Mr. Deepak Ratnawat, Engineer-in-Chief, Madhya Pradesh Urban Development Company Ltd. Guest Member
3. Mr. Hans Kumar Jain, Chief Engineer, Directorate Urban Administration and Development. Vice Chairman
4. Mr. Suresh Sejkar, Superintending Engineer, Directorate Urban Administration and Development. Member Secretary
5. Mr. Rajeev Goswami, Superintending Engineer, Directorate Urban Administration and Development. Member
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19. Mr. Ravi Chaturvedi, Executive Engineer, Directorate Urban Administration and Development. Member
20. Mr. Jeevendra Singh, Executive Engineer, Directorate Urban Administration and Development. Member

Special Thanks to:

- Mr. Nikhil Singh, Assistant Engineer, Directorate Urban Administration and Development.
- Ms. Gazal Khanna, Assistant Engineer, Municipal Corporation, Indore
- Mr. Kuldeep Raghuvanshi, Assistant Engineer, Municipal Council, Khurai
- Mr. Avinash Agrawal, Sub Engineer, Directorate Urban Administration and Development.
- Mr. Chandrakishor Suryawanshi, Sub Engineer, Directorate Urban Administration and Development.

INDEX

CHAPTER NO.	DESCRIPTION	PAGE NO.
		FROM -TO
	General Notes	2 - 12
1	Cast Iron Socket & Spigot Pipes and Specials with lead joints.	13 - 33
2	Cast Iron Socket & Spigot Pipes and Specials with Tyton Joints.	34 - 36
3	Cast Iron Pipes and Specials with flanged joints.	37 - 54
4	Ductile Iron Pressure Pipes and Specials with Tyton joints	55 - 77
5	Unplasticized PVC Pipes, PVC-O Pipes & Fittings for potable water supply.	78 - 85
6	Galvanised Iron Pipes, Specials and Gun Metal/Brass Metal Fittings.	86 - 99
7	HDPE Pipes, MDPE Pipe & Specials	100 - 117
8	M.S. Pipes & Specials	118 - 129
9	Asbestos Cement Pressure Pipe and Cast Iron Fittings.	130 - 140
10	Salt Glazed Stoneware Pipes.	141 - 144
11	Unplasticized Non-Pressure Polyvinyl Chloride (PVC-U) Pipes, DWC Pipes.	145 - 148
12	Reinforced Cement concrete Pipes.	149 - 157
13	Bar Wrapped Steel Cylinder Pipes (BWSC)	158 - 169
14	Sluice Gate & Valves	170 - 190
15	Water Hammer Devices	191 - 195
16	Pumps	196 - 206
17	Sewer Appurtenances.	207 - 222
18	Civil Works for Water Supply & Sewerage works.	223 - 236
19	Miscellaneous.	237 - 248
20	Construction of Tube Wells, Chlorination system & Trenchless work	249 - 271
21	Intake Well	272 - 278
22	Water Treatment Plant, Sewage Treatment Plant & Chlorination System	279 - 301
23	Ground Service Reservoir & Sumps Tanks	302 - 304
24	Reinforced Cement Concrete Elevated Service Reservoir (ESR)	305 - 310
25	List of IS Codes for Water Supply & Sanitary Engineering	311 - 330
26	Drawings for Water Supply & Sewerage.	331 - 383

GENERAL NOTES

- 1 The SOR of UADD Department consists of 4 Volumes
 VOLUME - I Water Supply, Sewerage and Tube Well Works
 VOLUME - II Building Works
 VOLUME - III Road & Bridge Works
 VOLUME - IV Electrical Works
- 2 The contents of each Volume are given below

VOLUME - I WATER SUPPLY, SEWERAGE AND TUBE WELL WORKS

	General Notes
1	Cast Iron Socket & Spigot Pipes and Specials with lead joints.
2	Cast Iron Socket & Spigot Pipes and Specials with Tyton Joints.
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15	Water Hammer Devices
16	Pumps
17	Sewer Appurtenances.
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23	Ground Service Reservoir & Sumps Tanks
24	Reinforced Cement Concrete Elevated Service Reservoir (ESR)
25	List of IS Codes for Water Supply & Sanitary Engineering
26	Drawings for Water Supply & Sewerage.

VOLUME - II
BUILDING WORKS

1	Carriage of Material
2	Earth work
3	Mortars
4	Concrete work
5	Reinforced Cement Concrete
6	Brick work
7	Stone work
8	Marble work
9	Wood Work & P.V.C. Work
10	Steel work
11	Flooring
12	Roofing
13	Finishing
14	Repair to Building works
15	Dismantling & Demolishing
16	Pile work
17	Aluminum work
18	Water proofing
19	Form Work
20	Rain Water Harvesting, Recycle and Reuse of waste water
21	Building Water Supply
22	Building Drainage
23	Sanitary Installation

VOLUME - III
ROAD & BRIDGES WORKS

ROAD WORKS	
1	Carriage of Material
2	Site Clearance
3	Earth work, Erosion control and Drainage
4	Sub-Bases, Bases (Non-Bituminous) and Shoulders
5	Bases and Surface courses (Bituminous)
6	Cement Concrete Pavements
7	Geosynthetics and Reinforced Earth
8	Traffic Signs, Marking & other Road Appurtenances
9	Supply of Material
10	Maintenance of Roads
11	Horticulture & Landscaping
BRIDGE WORKS	
12	Foundations
13	Sub-Structure
14	Super-Structure
15	River Training and Protection works
16	Repair and Rehabilitation

**VOLUME - IV
ELECTRICAL WORKS**

PART – 1 – INTERNAL ELECTRIFICATION

1	Wiring in surface /concealed rigid P.V.C. conduit system.
2	Wiring in surface /concealed rigid Steel conduit system.
3	Wiring in surface rigid P.V.C. casing capping system
4	Wiring in existing/conduit/P.V.C. casing capping system
5	Sub Mains in surface/concealed rigid steel conduit system.
6	Rewiring in existing conduit.
7	Control switch gear/Bus bar.
8	MCCB's, Isolators, MCB's, MCB-DB and fixing.
9	Accessories/Panel/Lamp/Telephone wires/Fans/Luminaries.
10	Miscellaneous
11	Earthing
12	Dismantling of Civil and Electrical Works.

PART – 2 – EXTERNAL ELECTRIFICATION

13	External Electrification and Over head lines
14	Power Cable & laying
15	Transformers & Fire Extinguishers
16	High Mast
17	G.I. Pipe and Pump Sets
18	Solar street light system
19	Supply and fixing of LED Lights.
20	Energy Saving and Protection solutions for Buildings.
21	Diesel Generator Set

General Notes

- 3 Rate for completed items include the cost of following :-
 - 3.1 All material, labour, workmanship, templates, tools, hire and running charges of plants & machinery required to complete the work, unless specified otherwise.
 - 3.2 All lead & lift of materials required for execution of work inclusive of charges like duties, tax, royalty etc.
 - 3.3 Provision for erection, removal of centering form works, scaffolding, benching, ladders and all other applications etc, required for execution of the work, unless otherwise specified.
 - 3.4 Provision for necessary covering to protect the work/structure from inclement weather etc. and damage arising from falling of materials or rains, fire etc shall be the responsibility of the contractor.
 - 3.5 Curing wherever required including arrangement of water and also including its lead or lift whatsoever.
 - 3.6 (i) The rates include charges for all tools and plant, chain pulley blocks, other appliances etc. required for lifting and laying of the pipes and specials in position as per approved drawings loading & unloading from store and return of balance material to store, if provided by ULBs and upto providing upto site if provided by contractor i/c all protection, storing as per norms of all materials, cleaning of site after construction etc. complete.

(ii) The rates include provision and use of all coverings etc. to protect the works from inclement weather etc. and from damages from fall of materials, and other causes.

(iii) The rate include provision of handling, storing under cover as required and returning of empty cases or container to U.A.D. Department stores without any extra cost, for such materials as may be supplied by the department.
- 4 The mode of measurements shall be as per provisions contained in the relevant chapters and in specifications/relevant IS codes.
- 5 All materials shall conform to the relevant prevailing Indian Standard Specifications. All material before use in works shall require approval of the Engineer in charge, who will get them sampled, tested as per relevant IS code at contractor's cost and samples so approved shall be kept in the office of the concerned Engineer-in-charge till finalization of the work.
- 6 Material obtained from excavation shall be the property of the Local body (Municipal Corporation, Municipal Council & Nagar Parishad).
- 7 Hard Rock available from excavation, shall be used for conversion into coarse aggregates or for other construction material and shall be issued to the contractor on the rate as decided by competent authority.

8 Cement :-

- 8.1 Where contract provides for cement to be arranged by the Contractor himself, only I.S.I. Marked cement as per IS for 33 grade Ordinary Portland cement confirming to IS 269 and for 43 grade Ordinary Portland cement, confirming to IS 8112 and for 53 grade Ordinary Portland cement, IS 12269 and for Portland Pozzolana cement, confirming to IS 1489 Part - I Fly ash based & Part II , calcined clay based specifications , shall be allowed to be used in the work subject to the prescribed tests.
- 8.2 Make of cement shall be got approved by the Engineer-in-charge. The engineer in charge shall get cement tested as per relevant IS codes, at the cost of the contractor, before use in work.
- 8.3 Pozzolona cement is now being widely produced all over the country. This may be used in structures as per provisions of IS code.
- 8.4 The arrangement for necessary equipment and testing shall have to be made by the contractor himself at site, as decided by the Engineer-in-Charge. All expenses shall be borne by the contractor.
- 8.5 Any lot of cement brought to site by the contractor, would be permitted to be used in the work only after the satisfactory results of the tests, under the supervision of the Engineer-in- Charge or his authorised representative. The record of the test results shall be maintained in register mentioned in subsequent para.
- 8.6 A duplicate register as prescribed by the competent authority of technical authority shall be maintained at the site of the work. Extract certified copies of the entries for each month shall be submitted to the Engineer-in-Charge by the Contractor.

The original register shall also be submitted to the Engineer-in-Charge on completion of the work by the Contractor.

- 9 Nominal mix would may be adopted for cement concrete M-7.5, M-10, M-15 and M-20 Design mix shall have to be adopted for concrete of higher strengths as per IS 456-2000.

10 Steel :-

- 10.1 Steel used for reinforcement shall conform as per under :-
- (a) Mild Steel and medium tensile steel bars shall conform to IS : 432 (Part-I), : 1982
 - (b) Hot rolled deformed bars shall conform to IS : 1139,
 - (c) Cold twisted bars shall conform to IS : 1786 : 2008
 - (d) Hard drawn steel wire fabric shall conform to IS : 1566 : 1982
 - (e) Rolled steel made from structural steel shall conform to IS : 226.
 - (f) Thermo Mechanically Treated bars of grade Fe-500D.
- 10.2 All reinforcement shall be free from loose mill scales, loose rust and coats of paints, oil, mud or other coatings which may destroy or reduce bond.

- 10.3 Only such steel obtained from main producers of steel i.e. SAIL, IISCO, TISCO or such steel rolling mills as having license from the B.I.S. to manufacture such steel for reinforcements, shall be allowed to be used in the work. The make of the steel shall be approved by engineer-in-charge.
- 10.4 The Contractor shall have to produce Test Certificate in the proforma prescribed approved by B.I.S. from the manufacturer for every batch of steel brought to the site of work.
- 10.5 Before commencement of use of steel, from any batch brought to site the of the work by the contractor, the Engineer-in-Charge shall arrange to get samples tested for nominal mass, tensile strength, bend test and rebend test from any Laboratory of his choice at the cost of Contractor. The selection of test specimens and frequency shall be as per relevant I.S. specification of the steel used.
- 11 If any item of work is found not upto the prescribed standard but the Engineer-in-charge is of the opinion that the same is structurally adequate and can be accepted at a reduced rate, then in such case, the Engineer-in-charge shall submit proposal for the same, supported by an analysis in justification thereof, through proper channel to the Superintending Engineer UADD to obtain his approval expeditiously (ordinarily within 15 days). The approved analysis along with orders of the Superintending Engineer should be appended to the final bill of the contractor.
- 12 In case of any contradiction in the provisions of the specifications and this schedule of rates, the decision of Engineer-in-Chief, UADD will be of precedence.
- 13 Interpretations :- The Engineer-in-Chief, UADD, Bhopal shall be the sole deciding Authority as to the meaning, interpretation and implications of various provisions in this schedule of rates. His decision shall be final and binding on all concerned.
- 14 Safety :- The contractor shall be fully and solely responsible for making all the safety arrangements pertaining to the work. The contractor shall be fully responsible and liable in all respects for any accidents and subsequent legal action initiated by any party including the department.
- 15 Latest IS codes with up to date amendments shall be applicable.
- 16 Labour rates considered are as per Labour Department, Madhya Pradesh Order No. 19829-971, Dated 27.05.2019
- 17 The rates given in ISSOR are exclusive of GST. It shall be paid extra as per applicabilty and as per sanction of the Commissioner Urban Administration Development Department. All the estimates based on this ISOR will include GST as an extra amount as per prevailing rates on the sum of the estimate to arrive at the gross amount.
- 17.1 The Rate of all items of ISSR are exclusive of GST but including all other levies and taxes.

- 17.2 At present for works GST Rate is payable to the contractor @ 12% of the bill amount and whenever any changed in GST is applied by the Govt. of India, M.P. State Govt. same shall be applied and payable to the contractor for his bill amount after taking permission from Commissioner Urban Administration and Development Department.
- 17.3 Non SOR items: If any Non S.O.R. Item is proposed in any upcoming project i.e. in DPR, rate analysis as per the market rate with full justification shall be prepared & got approved by Superintending Engineer/ Executive Engineer of the Divisional Office of Urban Administration and Development in case of Municipal Council/ Nagar Parishad & Executive Engineer of the concerned project of Corporation in case of Municipal Corporation and shall be included in BOQ under sub head of non SOR items. Tender shall be invited on amount inclusive of SOR and Non SOR items and in such cases non SOR items shall become schedule (BOQ) items for that particulars tender only. However it is made clear that such non SOR items shall not be assumed as sanctioned rates for other agreements.
- 17.4 The Engineer-in-charge (EIC) for Nagar Parishad shall be Divisional Executive Engineer, UADD of the concerned division, incase of Municipal Council, EIC Shall be Executive Engineer of the ULB. In case no executive engineer is posted in the concerned ULB, Divisional Executive Engineer, UADD of the concerned division shall be the EIC of the Project. In case of Municipal Corporation, Executive Engineer of the concerned project shall be the EIC.

**SPECIAL NOTES FOR
WATER SUPPLY, SEWERAGE AND TUBE WELL WORKS**

- 1 The materials such as pipes specials, valves etc either supply by local body or by the contractor shall conform to the specification mentioned in the schedule of rates and should in variably conform to the relevant I.S. Standards, B.S. standards/ material of best quality available in the market shall only to be used.
- 2 The work shall be executed in accordance with the U.A.D.D. specifications. In all cases, the latest revision of the Indian standards/codes for pipes, specials, valves etc. shall also be referred to. Latest C.P.H.E.E.O. manual, published by the Ministry of Urban Development, Govt. of India shall also be applicable. Incase of any discrepancy, the decision of Engineer-in-chief., U.A.D.D. shall be final.
- 3 Complete: The provision of all such materials and labour and the performance of all such workmanship which may be necessary for the proper execution of the work in best workmanship, manner but not particularly described in the items of schedule of rates.
- 4 Best: shall mean that in the opinion of the Engineer-in-Charge, there is no superior material or article or class of workmanship available in the market.
- 5 No alternative materials other than specified will generally be allowed to be used in the works except when their use becomes absolutely necessary in the interest of work on such grounds as non-availability in the market due to reasons beyond control.
- 6 The labour only provided in the Schedule of Rates includes the cost of all labour including necessary handling of the materials at site of work and all workmanship. The labour rates adopted for preparation of S.O.R. are inclusive of provision for weekly holiday.
- 7.1 The rates for completed items in the schedule of rates include the following.
 - 1 2% for T&P
 - 2 3% for over head charges
 - 3 10% for contractor's profit
- 7.2 For Departmental Works rates should be reduced by 10.434% (Contractor profit percentage 10% + T & P charge 2% i.e. $100 \times 12 / 115 = 10.434\%$)

7.3 Specifications :-

Work shall be executed in accordance with the specifications given in this schedule and the specifications for works in vogue in U.A.D.D., Govt. of M.P., and the specifications attached with the "Notice Inviting Tenders" and the "Contract Agreement". Latest C.P.H.E.E.O. manual, published by the Minister of Urban Development, Govt. of India shall also be applicable. In case of any discrepance, the specific provision in the "Contract Agreement" will take precedence and the decision of the authority, sanctioning the tender, shall be final and binding.

The materials to be used in works i.e. pipes : specials, valves etc, are to be supplied by the departmental store, unless otherwise mentioned in the contract document. As such, specifications for the same are not given in this schedule of rates. In case any materials are required to be supplied by the contractor for any particular work, materials confirming to relevant I.S. specification, B.S. specification, material of best quality available in the market duly Inspected by the authorised agency shall only to be used after the approval of the Engineer-in-Charge.

- 8 In exceptional cases if any work is found to be sub-standard, but the Engineer-in-charge is of the opinion that the same can be accepted at a reduced rate, then the Engineer-in-charge shall submit proposals for the same, supported by an analysis and justification of such reduction, to the next higher authority to obtain his/her approval expeditiously (ordinarily within 15 days). The approved analysis along with orders of the competent authority of Technical sanction should be appended to the final bill of the contractor.
- 9 (a) Rates for transportation in Chapter No. 16 (Miscellaneous) Item No. 16.15 "Carriage of Material" includes :-
(i) Loading and unloading
(ii) Stacking at suitable places as directed by the Engineer-in-charge, the weights of the container of any material shall be ignored.
- 10 Testing :-
- 10.1 The testing of the pipe line work shall be as per the provisions of the relevant IS codes.
- 10.2 The contractor, on completion, or whenever required by the Engineer-in-Charge, shall prove all materials and pipes, fittings, joints and other accessories etc. to be clear, clean, perfect in working conditions and strong enough to withstand the test so specified in different items of the specifications/applicable IS codes.
- 10.3 For this purpose the contractor at his own expense, shall provide all instruments & suitable appliances and carry out the necessary test before the Engineer-in-Charge or his authorised representative to his entire satisfaction.
- 10.4 The contractor shall rectify any defects as to the materials or workmanship, so noticed during the test and the defective portions re-tested at his expense.
- 10.5 Till such time the sectional hydraulic testing is completed, 10% of the particular item amount derived at the time of payment of RA bill shall be withhold from the contractor's running bill and same will be released only after testing, up to the entire satisfaction of the Engineer-in-Charge. But this sectional hydraulic testing can not be put on hold long time & should be completed with entire satisfaction of engineer in charge before submission of next RA bill. Normally sectional hydraulic testing should be done for min. 500 m length of laid pipe line or sewer line & max. upto 1000m.
- 10.6 **Refilling the trenches**
- 10.6.1 **Use of selected excavated material**
Filling of excavated material in trenches shall be commenced as soon as the joints of pipes and specials have been hydraulically tested and passed. The backfilling material shall be properly consolidated by watering and ramming, taking due care that no damage is caused to the pipes and the outer coating.
Selected surplus spoils from excavated material shall be used as backfill. Fill material shall be free from clods, salts, sulphate, organic or other foreign material. All clods of earth shall be broken or removed. Where excavated material is mostly rock, the boulders shall be broken into pieces not larger than 150 mm size, mixed with properly graded fine material consisting of mureom or earth to fill up the voids and the mixture used for filling.
- 10.6.2 **Filling zones**
For the purpose of back-filling, the depth of the trench shall be considered as divided in to the following three zones from the bottom of the trench to its top:
-

Zone A: From the bottom of the pipe (top of bedding) to the level of the centre line of the pipe	Back-filling by hand with selected approved material available from excavation, placed in layers of 150 mm and compacted by tamping. The back-filling material shall be deposited in the trench for its full width on each side of the pipe, specials and appurtenances simultaneously. Special care shall be taken to avoid damage of the pipe and the coating or moving of the pipe.
Zone B: From the level of the centre line of the pipe to a level 300 mm above the top of the pipe	Back-filling and compaction shall be done by hand or approved mechanical methods in layers of 150 mm; special care shall be taken to avoid damage of the pipe and the coating or moving of the pipe.
Zone C:	Back-filling shall be done by mechanical methods in 15 cm.

10.6.3 All excavations shall be backfilled to the level of the original ground surfaces unless otherwise shown on the drawings or ordered by the Engineer-in-Charge in Charge, and in accordance with the requirements of the specification. The material used for backfill, the amount thereof, and the manner of depositing and compacting shall be subject to the approval of the Engineer-in-Charge in Charge, but the Contractor will be held responsible for any displacement of pipe or other structures, any damage to their surfaces, or any instability of pipes and structures caused by improper depositing of backfill materials.

The back filled layers shall be wetted and compacted to a density of minimum 90 percent of the maximum dry density at optimum moisture content of the surrounding material. Any deficiency in the quantity of material for backfilling the trenches shall be supplied by the Contractor at his expense. The Contractor shall at his own expense make good any settlement of the trench backfill occurring after backfilling and until the expiry of the defects liability period. On completion of pressure and leakage tests exposed joints shall be covered with approved selected backfill placed above the top of the pipe and joints in accordance with the requirements of the above specifications. The Contractor shall not use backfilling for disposal as refuse or unsuitable soil.

10.6.4 Fillings of the trench excavated in rock

In case of excavation of trenches in rock, the filling up to a level of 30 cm above the top of the pipe shall be done with fine materials, such as soft soil, murrum etc. The filling up of the level of the centre line of the pipe shall be done by hand compaction in layers not exceeding 15 cm, whereas the filling above the centre line of the pipe shall be done by hand compaction or mechanical means in layers not exceeding 15 cm. The filling from a level of 30 cm above the top of the pipe to the top of the trench shall be done by mechanical methods with broken rock filling of size not exceeding 15 cm mixed with fine material as available to fill up the voids.

10.6.5 Consolidation

The consolidation of the filled material shall be done to attain to the extent of 95 % proctor density in order to avoid further settlement. The density of the filled and compacted material shall be tested regularly and record maintained accordingly.

- 11 Road restoration -It shall be the contractor's responsibility to restore road after laying of pipe line or other work in same condition as it was before starting of work as per standard practice & norms. The work shall be done in sections and maximum length upto 1000m and then sectional hydrotesting of particular section shall be done before backfilling and then it shall be backfilled immediately within 48 hours as mentioned above to make it approachable/ motorable with proper compaction. Permanent restoration shall be done, if contractor finds essential as per site conditions but it shall be overall responsibility of the contractor to provide barricades, safety measures, and not to create any inconvenience to the citizen/traffic. In case of temporary or permanent restoration, it shall be contractor's responsibility to restore any settlement or damage immediately and upto defect liability period or upto O&M period as mentioned. The Contractor shall at his own expense make good any settlement of the trench backfill occurring after backfilling and until the defect liability period or O&M period as mentioned.
- 12 COMMISSIONING OF PIPE LINE: After completion of overall work i/c testing of pipeline in section, it shall be commissioned as a whole and at the time of commissioning of whole project or only line as the case may be, any defect, noticed, shall immediately be attended and rectified by the contractor free of cost.
- 13 COMPLETION OF WORK:- The work shall be deemed to be successfully completed when all works mentioned in agreement and in project as a whole completed physically & financially except operation & maintenance as per the contract agreement and only after a certificate is issued to this effect by the Engineer-in-charge.
- 14 Replacement of pavements and structures:- All pavements, paved footpaths, curbing, gutters, shrubbery, fences, poles, sides or other property and surface structures removed or disturbed as a part of the work shall be restored to a condition equal to that before the work began, furnishing all labour and materials incidental thereto. In restoring the pavement, sound granite blocks, sound brick or asphalt paving blocks may be re-used. Permanent pavement shall only be restored until, in the opinion of the Engineer-in-Charge, the condition of the back-fill is such as to properly support the pavement.
- 15 If Govt./local body water source like water supply distribution pipe line, tube well, well etc. is used for construction activity by the contractor then water charges shall be deducted at the rate of 1% of the amount paid to the contractor from the item involving the use of water.

CHAPTER 1

CAST IRON SOCKET AND SPIGOT PIPES AND SPECIALS WITH LEAD JOINTS

- 1 C.I. Pipes shall conform to IS: IS: 1536 -2001(Reaffirmation year 2016) duly inspected and tested and having BIS certification mark.
- 2 Specials shall conform to IS: 1538 - 1993 (Reaffirmation year 2018) duly inspected and tested and having BIS certification mark.
- 3 Jointing material lead shall conform to IS:782 - 1978 (Reaffirmation year 2017) duly inspected and tested and having BIS certification mark.
- 4 Code of practice for laying of cast iron pipes shall be as per IS:3114 - 1994 (Reaffirmation year 2014) & other standard code of practice.
Methods for sampling of Cast Iron Pipes & fittings shall be as per IS : 11606:1986 (Reaffirmation year 2014)
- 5 Each pipe shall have the following mark either cast, stamped or indelibly painted on it, Marking may be done on the socket faces of pipe centrifugally cast in metal mould or on the outside of the socket or on the barrel of pipe centrifugally cast in sand mould.
 - a) Manufacturer's name, initials or identification mark;
 - b) The nominal diameter;
 - c) Class reference;
 - d) Mass of Pipe
 - e) The last two digits of the year of manufacture.
- 6 All measurements shall be of the finished work.
- 7 Work shall be executed in accordance with the relevant Indian Standard Specifications (Updated) and all the conditions of the agreement of the work.
- 8 The pipes and fittings shall be inspected for defects and be rung with a light hammer, preferably while suspended, to detect cracks. Smearing the outside with chalk dust helps the location of cracks. If doubt persists further confirmation may be obtained by pouring a kerosene which seeps through and shows on the outer surface.

9 Laying :

Laying of pipes and fittings/specials includes all precautions to guard against possible damage to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with special arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/ specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.

10 Measurement:

- (a) The net length of pipes as laid or fixed should be measured in running meters correct to a cm. Specials should be excluded and enumerated and paid for separately. The portion of the pipe within the collar at the joints shall not be included in the length of pipe work.
- (b) C.I. Pipe are designated by Inner diameter.

11 Rates

- a) The rates include charges for all tools & plants, chain pulley blocks, other appliances etc. required for lifting and laying the pipes and specials in positions as per approved drawing.
 - b) The rates include provision and use of all coverings etc. to protect the works from inclement weather etc. and from damages from fall of materials, and other causes.
- 12 Other relevant IS which are not mentioned but applicable, shall also be applied.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Codes & CPHEEO Manual)

**CHAPTER 1- CAST IRON SOCKET AND SPIGOT PIPES AND SPECIALS WITH
LEAD JOINTS**

S.No.	Particulars of Items	Unit	Rates (in Rs.)		
			LA Class	A Class	B Class
1.1	Providing, laying, jointing of socket and spigot cast iron (Spun) Pipes including testing of joints, cost of pipes and jointing materials etc. complete.				
1.1.1	80mm diameter	RM	1327.00	1435.00	1534.00
1.1.2	100mm diameter	RM	1605.00	1756.00	1868.00
1.1.3	125mm diameter	RM	2022.00	2197.00	2395.00
1.1.4	150mm diameter	RM	2446.00	2666.00	2860.00
1.1.5	200mm diameter	RM	3565.00	3852.00	4151.00
1.1.6	250mm diameter	RM	4778.00	5200.00	5545.00
1.1.7	300mm diameter	RM	6150.00	6693.00	7226.00
1.1.8	350mm diameter	RM	7713.00	8335.00	9006.00
1.1.9	400mm diameter	RM	9395.00	10227.00	11006.00
1.1.10	450mm diameter	RM	11579.00	11626.00	13616.00
1.1.11	500mm diameter	RM	13507.00	14659.00	15810.00
1.1.12	600mm diameter	RM	17917.00	19486.00	21040.00
1.1.13	700mm diameter	RM	23024.00	25068.00	27007.00
1.1.14	750mm diameter	RM	25786.00	28094.00	30387.00
1.1.15	800mm diameter	RM	28927.00	31406.00	33871.00
1.1.16	900mm diameter	RM	35162.00	38233.00	41304.00
1.1.17	1000mm diameter	RM	42193.00	45937.00	49510.00
1.2	Labour for laying in position socket & spigot cast iron (Spun) pipes.				
1.2.1	80mm diameter	RM	12.00	13.00	14.00
1.2.2	100mm diameter	RM	15.00	16.00	18.00
1.2.3	125mm diameter	RM	20.00	21.00	23.00
1.2.4	150 mm diameter	RM	24.00	27.00	28.00
1.2.5	200mm diameter	RM	36.00	39.00	41.00
1.2.6	250mm diameter	RM	49.00	53.00	57.00
1.2.7	300mm diameter	RM	63.00	68.00	74.00
1.2.8	350mm diameter	RM	80.00	87.00	93.00
1.2.9	400mm diameter	RM	97.00	106.00	113.00
1.2.10	450mm diameter	RM	118.00	129.00	138.00
1.2.11	500mm diameter	RM	137.00	148.00	159.00
1.2.12	600mm diameter	RM	185.00	200.00	216.00
1.2.13	700mm diameter	RM	235.00	254.00	273.00
1.2.14	750mm diameter	RM	260.00	282.00	304.00
1.2.15	800mm diameter	RM	289.00	313.00	337.00
1.2.16	900mm diameter	RM	357.00	387.00	417.00
1.2.17	1000mm diameter	RM	432.00	469.00	503.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
1.3	Jointing of socket & spigot cast iron (spun) pipes and specials class 'LA' 'A' and 'B' including labour & cost of jointing materials (i.e. pig lead and spun yarn etc. complete) etc. and testing of the joints complete.		
1.3.1	80mm diameter	Each	303.00
1.3.2	100mm diameter	Each	356.00
1.3.3	125mm diameter	Each	451.00
1.3.4	150mm diameter	Each	545.00
1.3.5	200mm diameter	Each	777.00
1.3.6	250mm diameter	Each	953.00
1.3.7	300mm diameter	Each	1132.00
1.3.8	350mm diameter	Each	1281.00
1.3.9	400mm diameter	Each	1506.00
1.3.10	450mm diameter	Each	2055.00
1.3.11	500mm diameter	Each	2177.00
1.3.12	600mm diameter	Each	2793.00
1.3.13	700mm diameter	Each	3187.00
1.3.14	750mm diameter	Each	3581.00
1.3.15	800mm diameter	Each	4332.00
1.3.16	900mm diameter	Each	4926.00
1.3.17	1000mm diameter	Each	5683.00
1.4	Labour for jointing of socket & spigot cast iron (spun) pipes and specials class 'LA' 'A' and 'B' including testing of joints but excluding cost of jointing materials (i.e. pig lead and spun yarn etc. complete) & testing.		
1.4.1	80mm diameter	Each	83.00
1.4.2	100mm diameter	Each	88.00
1.4.3	125mm diameter	Each	129.00
1.4.4	150mm diameter	Each	133.00
1.4.5	200mm diameter	Each	176.00
1.4.6	250mm diameter	Each	218.00
1.4.7	300mm diameter	Each	260.00
1.4.8	350mm diameter	Each	274.00
1.4.9	400mm diameter	Each	353.00
1.4.10	450mm diameter	Each	395.00
1.4.11	500mm diameter	Each	418.00
1.4.12	600mm diameter	Each	564.00
1.4.13	700mm diameter	Each	602.00
1.4.14	750mm diameter	Each	656.00
1.4.15	800mm diameter	Each	721.00
1.4.16	900mm diameter	Each	825.00
1.4.17	1000mm diameter	Each	894.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
1.5	Providing and laying in position double socket cast iron 90° bend.		Medium Class	Heavy Class
1.5.1	80mm diameter	Each	1319.00	1431.00
1.5.2	100mm diameter	Each	1829.00	1910.00
1.5.3	125mm diameter	Each	2466.00	2625.00
1.5.4	150mm diameter	Each	3261.00	3420.00
1.5.5	200mm diameter	Each	5011.00	5329.00
1.5.6	250mm diameter	Each	7239.00	7795.00
1.5.7	300mm diameter	Each	9943.00	10739.00
1.5.8	350mm diameter	Each	14370.00	15575.00
1.5.9	400mm diameter	Each	18500.00	20135.00
1.5.10	450mm diameter	Each	22803.00	24954.00
1.5.11	500mm diameter	Each	29084.00	31838.00
1.5.12	600mm diameter	Each	42680.00	46982.00
1.5.13	700mm diameter	Each	59975.00	66257.00
1.5.14	750mm diameter	Each	69871.00	77357.00
1.5.15	800mm diameter	Each	82457.00	91454.00
1.5.16	900mm diameter	Each	108923.00	121327.00
1.5.17	1000mm diameter	Each	139496.00	155481.00
1.6	Providing and laying in position 45° bend double socket cast iron.		Medium Class	Heavy Class
1.6.1	80mm diameter	Each	1319.00	1431.00
1.6.2	100mm diameter	Each	1829.00	1910.00
1.6.3	125mm diameter	Each	2387.00	2546.00
1.6.4	150mm diameter	Each	3102.00	3261.00
1.6.5	200mm diameter	Each	4613.00	4931.00
1.6.6	250mm diameter	Each	6602.00	7080.00
1.6.7	300mm diameter	Each	8988.00	9625.00
1.6.8	350mm diameter	Each	12736.00	13682.00
1.6.9	400mm diameter	Each	16177.00	17381.00
1.6.10	450mm diameter	Each	19705.00	21339.00
1.6.11	500mm diameter	Each	24696.00	26675.00
1.6.12	600mm diameter	Each	35451.00	38549.00
1.6.13	700mm diameter	Each	48876.00	53264.00
1.6.14	750mm diameter	Each	56362.00	61610.00
1.6.15	800mm diameter	Each	66035.00	72238.00
1.6.16	900mm diameter	Each	85602.00	94074.00
1.6.17	1000mm diameter	Each	108574.00	119493.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
1.7	Providing and laying in position double socket cast iron 22½° bend.		Medium Class	Heavy Class
1.7.1	80mm diameter	Each	1150.00	1272.00
1.7.2	100mm diameter	Each	1590.00	1670.00
1.7.3	125mm diameter	Each	2069.00	2148.00
1.7.4	150mm diameter	Each	2705.00	2784.00
1.7.5	200mm diameter	Each	4057.00	4216.00
1.7.6	250mm diameter	Each	5728.00	5966.00
1.7.7	300mm diameter	Each	7557.00	7954.00
1.7.8	350mm diameter	Each	10584.00	11187.00
1.7.9	400mm diameter	Each	13337.00	14112.00
1.7.10	450mm diameter	Each	16005.00	16951.00
1.7.11	500mm diameter	Each	19963.00	21168.00
1.7.12	600mm diameter	Each	28310.00	30203.00
1.7.13	700mm diameter	Each	38377.00	41131.00
1.7.14	750mm diameter	Each	44486.00	47412.00
1.7.15	800mm diameter	Each	51361.00	55205.00
1.7.16	900mm diameter	Each	65860.00	71015.00
1.7.17	1000mm diameter	Each	82806.00	89445.00
1.8	Providing and laying in position double socket cast iron 11¼° bend.		Medium Class	Heavy Class
1.8.1	80mm diameter	Each	1113.00	1193.00
1.8.2	100mm diameter	Each	1431.00	1511.00
1.8.3	125mm diameter	Each	1910.00	1989.00
1.8.4	150mm diameter	Each	2466.00	2546.00
1.8.5	200mm diameter	Each	3659.00	3818.00
1.8.6	250mm diameter	Each	5170.00	5329.00
1.8.7	300mm diameter	Each	6841.00	7080.00
1.8.8	350mm diameter	Each	9465.00	9895.00
1.8.9	400mm diameter	Each	11874.00	12391.00
1.8.10	450mm diameter	Each	14112.00	14800.00
1.8.11	500mm diameter	Each	17640.00	18500.00
1.8.12	600mm diameter	Each	24696.00	25986.00
1.8.13	700mm diameter	Each	33215.00	35108.00
1.8.14	750mm diameter	Each	38119.00	40357.00
1.8.15	800mm diameter	Each	43762.00	46645.00
1.8.16	900mm diameter	Each	55991.00	59572.00
1.8.17	1000mm diameter	Each	69879.00	74421.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
1.9	Providing and laying in position all socket cast iron Tees (all sizes in millimeters) Body x Branch Dia.			
1.9.1	80x80	Each	1721.00	1800.00
1.9.2	100x80	Each	2112.00	2191.00
1.9.3	100x100	Each	2269.00	2348.00
1.9.4	125x80	Each	2660.00	2817.00
1.9.5	125x100	Each	2817.00	2974.00
1.9.6	125x125	Each	3052.00	3208.00
1.9.7	150x80	Each	3364.00	3521.00
1.9.8	150x100	Each	3521.00	3677.00
1.9.9	150x125	Each	3677.00	3912.00
1.9.10	150x150	Each	3912.00	4147.00
1.9.11	200x80	Each	4929.00	5243.00
1.9.12	200x100	Each	5086.00	5398.00
1.9.13	200x125	Each	5243.00	5555.00
1.9.14	200x150	Each	5477.00	5790.00
1.9.15	200x200	Each	6024.00	6338.00
1.9.16	250x80	Each	6886.00	7355.00
1.9.17	250x100	Each	7041.00	7512.00
1.9.18	250x125	Each	7277.00	7746.00
1.9.19	250x150	Each	7512.00	7981.00
1.9.20	250x200	Each	7981.00	8450.00
1.9.21	250x250	Each	8529.00	9076.00
1.9.22	300x80	Each	9311.00	10015.00
1.9.23	300x100	Each	9389.00	10093.00
1.9.24	300x125	Each	9624.00	10328.00
1.9.25	300x150	Each	9780.00	10484.00
1.9.26	300x200	Each	10406.00	11110.00
1.9.27	300x250	Each	10954.00	11736.00
1.9.28	300x300	Each	11658.00	12441.00
1.9.29	350x200	Each	14542.00	15661.00
1.9.30	350x250	Each	15231.00	16349.00
1.9.31	350x300	Each	16005.00	17124.00
1.9.32	350x350	Each	16780.00	17984.00
1.9.33	400x200	Each	18243.00	19705.00
1.9.34	400x250	Each	18930.00	20393.00
1.9.35	400x300	Each	19619.00	21168.00
1.9.36	400x350	Each	20479.00	22028.00
1.9.37	400x400	Each	21512.00	23061.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.9.38	450x250	Each	23577.00	25384.00
1.9.39	450x300	Each	24351.00	26159.00
1.9.40	450x350	Each	25212.00	27019.00
1.9.41	450x400	Each	26072.00	27879.00
1.9.42	450x450	Each	27105.00	28998.00
1.9.43	500x250	Each	28138.00	30633.00
1.9.44	500x300	Each	28912.00	31407.00
1.9.45	500x350	Each	29773.00	32268.00
1.9.46	500x400	Each	30633.00	33215.00
1.9.47	500x450	Each	31666.00	34247.00
1.9.48	500x500	Each	32870.00	35538.00
1.9.49	600x300	Each	40958.00	44831.00
1.9.50	600x350	Each	41820.00	45692.00
1.9.51	600x400	Each	42852.00	46724.00
1.9.52	600x450	Each	43884.00	47843.00
1.9.53	600x500	Each	45003.00	48961.00
1.9.54	600x600	Each	47671.00	51801.00
1.9.55	700x350	Each	57480.00	62729.00
1.9.56	700x400	Each	58512.00	63848.00
1.9.57	700x450	Each	59631.00	65052.00
1.9.58	700x500	Each	60750.00	66171.00
1.9.59	700x600	Each	63073.00	68408.00
1.9.60	700x700	Each	66084.00	71592.00
1.9.61	750x400	Each	67203.00	73571.00
1.9.62	750x450	Each	68408.00	74776.00
1.9.63	750x500	Each	69612.00	76066.00
1.9.64	750x600	Each	71936.00	78390.00
1.9.65	750x700	Each	74603.00	81057.00
1.9.66	750x750	Each	76496.00	83036.00
1.9.67	800x400	Each	78264.00	85776.00
1.9.68	800x450	Each	79400.00	86999.00
1.9.69	800x500	Each	80623.00	88222.00
1.9.70	800x600	Each	83243.00	90842.00
1.9.71	800x700	Each	85951.00	93638.00
1.9.72	800x750	Each	87349.00	95123.00
1.9.73	800x800	Each	89445.00	97307.00
1.9.74	900x450	Each	102198.00	112505.00
1.9.75	900x500	Each	103421.00	113728.00
1.9.76	900x600	Each	106304.00	116785.00
1.9.77	900x700	Each	109273.00	119755.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.9.78	900x750	Each	110671.00	121240.00
1.9.79	900x800	Each	112243.00	122725.00
1.9.80	900x900	Each	116262.00	126917.00
1.9.81	1000x500	Each	130412.00	143950.00
1.9.82	1000x600	Each	133207.00	146833.00
1.9.83	1000x700	Each	136700.00	150502.00
1.9.84	1000x750	Each	138186.00	152074.00
1.9.85	1000x800	Each	139845.00	153646.00
1.9.86	1000x900	Each	143164.00	156966.00
1.9.87	1000x1000	Each	147881.00	161769.00
1.10	Providing and laying in position all socketed cast iron crosses (all sizes in millimeter).		Medium Class	Heavy Class
1.10.1	80 mm	Each	2420.00	2503.00
1.10.2	100 mm	Each	3088.00	3255.00
1.10.3	125 mm	Each	4172.00	4339.00
1.10.4	150 mm	Each	5340.00	5591.00
1.10.5	200 mm	Each	8094.00	8512.00
1.10.6	250 mm	Each	11432.00	12099.00
1.10.7	300 mm	Each	15521.00	16439.00
1.11	Providing and laying in position socket & spigot cast iron tapers (Reducer) (all sizes in mm).		Medium Class	Heavy Class
1.11.1	100x80	Each	1174.00	1252.00
1.11.2	125x80	Each	1565.00	1643.00
1.11.3	125x100	Each	1643.00	1800.00
1.11.4	150x80	Each	1956.00	2112.00
1.11.5	150x100	Each	2034.00	2191.00
1.11.6	150x125	Each	2191.00	2426.00
1.11.7	200x100	Each	2895.00	3129.00
1.11.8	200x125	Each	3052.00	3286.00
1.11.9	200x150	Each	3286.00	3521.00
1.11.10	250x125	Each	4147.00	4381.00
1.11.11	250x150	Each	4303.00	4617.00
1.11.12	250x200	Each	4772.00	5164.00
1.11.13	300x150	Each	5790.00	6260.00
1.11.14	300x200	Each	6338.00	6886.00
1.11.15	300x250	Each	6886.00	7589.00
1.11.16	350x200	Each	8385.00	9084.00
1.11.17	350x250	Each	9084.00	9871.00
1.11.18	350x300	Each	9783.00	10744.00
1.11.19	400x250	Each	11443.00	12491.00
1.11.20	400x300	Each	12317.00	13451.00
1.11.21	400x350	Each	13189.00	14500.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.11.22	450x350	Each	14762.00	16159.00
1.11.23	450x400	Each	15810.00	17382.00
1.11.24	500x350	Each	16946.00	18431.00
1.11.25	500x400	Each	17994.00	19654.00
1.11.26	500x450	Each	19130.00	20964.00
1.11.27	600x400	Each	24021.00	26205.00
1.11.28	600x450	Each	25244.00	27602.00
1.11.29	600x500	Each	26554.00	29088.00
1.11.30	700x500	Each	31882.00	34765.00
1.11.31	700x600	Each	34852.00	38172.00
1.11.32	750x600	Each	39219.00	42976.00
1.11.33	750x700	Each	42801.00	47081.00
1.11.34	800x600	Each	41303.00	45136.00
1.11.35	800x700	Each	44710.00	49139.00
1.11.36	800x750	Each	46668.00	51353.00
1.11.37	900x700	Each	53481.00	58421.00
1.11.38	900x750	Each	55440.00	63190.00
1.11.39	900x800	Each	57484.00	60721.00
1.11.40	1000x800	Each	65234.00	71280.00
1.11.41	1000x900	Each	69663.00	76476.00
1.12	Providing and laying in position Double Socket cast iron tapers (reducer) (all sizes in mm).		Medium Class	Heavy Class
1.12.1	100x80	Each	1174.00	1408.00
1.12.2	125x80	Each	1565.00	2112.00
1.12.3	125x100	Each	1643.00	2348.00
1.12.4	150x80	Each	1956.00	2426.00
1.12.5	150x100	Each	2034.00	2660.00
1.12.6	150x125	Each	2191.00	2974.00
1.12.7	200x100	Each	2895.00	3364.00
1.12.8	200x125	Each	3052.00	3677.00
1.12.9	200x150	Each	3286.00	3991.00
1.12.10	250x125	Each	4147.00	4538.00
1.12.11	250x150	Each	4303.00	4851.00
1.12.12	250x200	Each	4772.00	5634.00
1.12.13	300x150	Each	5790.00	5868.00
1.12.14	300x200	Each	6338.00	6572.00
1.12.15	300x250	Each	6886.00	7433.00
1.12.16	350x200	Each	8385.00	10220.00
1.12.17	350x250	Each	9084.00	11443.00
1.12.18	350x300	Each	9783.00	12753.00
1.12.19	400x250	Each	11443.00	13014.00
1.12.20	400x300	Each	12317.00	14325.00
1.12.21	400x350	Each	13189.00	15810.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.12.22	450x350	Each	14762.00	17033.00
1.12.23	450x400	Each	15810.00	18605.00
1.12.24	500x350	Each	16946.00	19392.00
1.12.25	500x400	Each	17994.00	21052.00
1.12.26	500x450	Each	19130.00	22361.00
1.12.27	600x400	Each	24021.00	26205.00
1.12.28	600x450	Each	25244.00	27078.00
1.12.29	600x500	Each	26554.00	29000.00
1.12.30	700x500	Each	31882.00	33891.00
1.12.31	700x600	Each	34852.00	38172.00
1.12.32	750x600	Each	39219.00	41054.00
1.12.33	750x700	Each	42801.00	45596.00
1.12.34	800x600	Each	39039.00	42892.00
1.12.35	800x700	Each	43234.00	47686.00
1.12.36	800x750	Each	45802.00	50511.00
1.12.37	900x700	Each	48885.00	53850.00
1.12.38	900x750	Each	51624.00	59415.00
1.12.39	900x800	Each	55990.00	59244.00
1.12.40	1000x800	Each	60014.00	66092.00
1.12.41	1000x900	Each	65322.00	72171.00
1.13	Providing and laying in position cast iron collars.		Medium Class	Heavy Class
1.13.1	80mm diameter	Each	1017.00	1095.00
1.13.2	100mm diameter	Each	1252.00	1331.00
1.13.3	125mm diameter	Each	1643.00	1721.00
1.13.4	150mm diameter	Each	2112.00	2191.00
1.13.5	200mm diameter	Each	2974.00	3129.00
1.13.6	250mm diameter	Each	4069.00	4303.00
1.13.7	300mm diameter	Each	5320.00	5555.00
1.13.8	350mm diameter	Each	7288.00	7627.00
1.13.9	400mm diameter	Each	8729.00	9322.00
1.13.10	450mm diameter	Each	10763.00	11272.00
1.13.11	500mm diameter	Each	12797.00	13475.00
1.13.12	600mm diameter	Each	17373.00	18305.00
1.13.13	700mm diameter	Each	22796.00	23984.00
1.13.14	750mm diameter	Each	25763.00	27119.00
1.13.15	800mm diameter	Each	29786.00	31445.00
1.13.16	900mm diameter	Each	37036.00	39132.00
1.13.17	1000mm diameter	Each	45247.00	47779.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.14	Providing and laying in position cast iron socket caps.			Heavy Class
1.14.1	80mm diameter	Each		548.00
1.14.2	100mm diameter	Each		704.00
1.14.3	125mm diameter	Each		939.00
1.14.4	150mm diameter	Each		1174.00
1.14.5	200mm diameter	Each		1878.00
1.14.6	250mm diameter	Each		2660.00
1.14.7	300mm diameter	Each		3600.00
1.14.8	350mm diameter	Each		5170.00
1.14.9	400mm diameter	Each		6525.00
1.14.10	450mm diameter	Each		8221.00
1.14.11	500mm diameter	Each		10000.00
1.14.12	600mm diameter	Each		14492.00
1.14.13	700mm diameter	Each		19916.00
1.14.14	750mm diameter	Each		23051.00
1.14.15	800mm diameter	Each		27428.00
1.14.16	900mm diameter	Each		35376.00
1.14.17	1000mm diameter	Each		44897.00
1.15	Providing and laying in position cast iron plugs.		Medium Class	Heavy Class
1.15.1	80mm diameter	Each	157.00	235.00
1.15.2	100mm diameter	Each	235.00	312.00
1.15.3	125mm diameter	Each	391.00	469.00
1.15.4	150mm diameter	Each	626.00	704.00
1.15.5	200mm diameter	Each	1017.00	1095.00
1.15.6	250mm diameter	Each	1565.00	1721.00
1.15.7	300mm diameter	Each	2191.00	2348.00
1.15.8	350mm diameter	Each	3121.00	3368.00
1.15.9	400mm diameter	Each	4190.00	4436.00
1.15.10	450mm diameter	Each	5339.00	5668.00
1.15.11	500mm diameter	Each	6654.00	7065.00
1.15.12	600mm diameter	Each	9857.00	10433.00
1.15.13	700mm diameter	Each	14047.00	14786.00
1.15.14	750mm diameter	Each	16511.00	17333.00
1.15.15	800mm diameter	Each	19916.00	20848.00
1.15.16	900mm diameter	Each	26018.00	27204.00
1.15.17	1000mm diameter	Each	33391.00	34831.00
1.16	Providing and laying in position sizes of socket & spigot or all socketed cast iron specials class MEDIUM or HEAVY which does not appear in above items of schedule.		Medium Class	Heavy Class
1.16.1	80mm to 300mm dia	Kg	78.00	78.00
1.16.2	Above 300mm Dia	Kg	82.00	82.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
1.17	Labour for laying in position double socket cast iron 45° bends.		Medium Class	Heavy Class
1.17.1	80mm diameter	Each	NA	24.00
1.17.2	100mm diameter	Each	30.00	31.00
1.17.3	125mm diameter	Each	39.00	42.00
1.17.4	150mm diameter	Each	51.00	54.00
1.17.5	200mm diameter	Each	76.00	81.00
1.17.6	250mm diameter	Each	109.00	117.00
1.17.7	300mm diameter	Each	148.00	158.00
1.17.8	350mm diameter	Each	194.00	208.00
1.17.9	400mm diameter	Each	246.00	265.00
1.17.10	450mm diameter	Each	300.00	325.00
1.17.11	500mm diameter	Each	376.00	406.00
1.17.12	600mm diameter	Each	540.00	587.00
1.17.13	700mm diameter	Each	744.00	811.00
1.17.14	750mm diameter	Each	858.00	938.00
1.17.15	800mm diameter	Each	990.00	1083.00
1.17.16	900mm diameter	Each	1284.00	1411.00
1.17.17	1000mm diameter	Each	1628.00	1792.00
1.18	Labour for laying in position double socket cast iron 90° bends.		Medium Class	Heavy Class
1.18.1	80mm diameter	Each	NA	24.00
1.18.2	100mm diameter	Each	30.00	31.00
1.18.3	125mm diameter	Each	41.00	43.00
1.18.4	150mm diameter	Each	54.00	56.00
1.18.5	200mm diameter	Each	83.00	88.00
1.18.6	250mm diameter	Each	119.00	128.00
1.18.7	300mm diameter	Each	164.00	177.00
1.18.8	350mm diameter	Each	219.00	237.00
1.18.9	400mm diameter	Each	282.00	306.00
1.18.10	450mm diameter	Each	347.00	380.00
1.18.11	500mm diameter	Each	443.00	485.00
1.18.12	600mm diameter	Each	650.00	715.00
1.18.13	700mm diameter	Each	913.00	1008.00
1.18.14	750mm diameter	Each	1064.00	1177.00
1.18.15	800mm diameter	Each	1236.00	1371.00
1.18.16	900mm diameter	Each	1633.00	1819.00
1.18.17	1000mm diameter	Each	2092.00	2331.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
1.19	Labour for laying in position double socket cast iron 22½° bends.			
1.19.1	80mm diameter	Each	NA	21.00
1.19.2	100mm diameter	Each	26.00	28.00
1.19.3	125mm diameter	Each	34.00	35.00
1.19.4	150mm diameter	Each	45.00	46.00
1.19.5	200mm diameter	Each	67.00	69.00
1.19.6	250mm diameter	Each	94.00	98.00
1.19.7	300mm diameter	Each	124.00	131.00
1.19.8	350mm diameter	Each	161.00	170.00
1.19.9	400mm diameter	Each	203.00	215.00
1.19.10	450mm diameter	Each	244.00	258.00
1.19.11	500mm diameter	Each	304.00	322.00
1.19.12	600mm diameter	Each	431.00	460.00
1.19.13	700mm diameter	Each	584.00	626.00
1.19.14	750mm diameter	Each	677.00	722.00
1.19.15	800mm diameter	Each	770.00	828.00
1.19.16	900mm diameter	Each	988.00	1065.00
1.19.17	1000mm diameter	Each	1242.00	1341.00
1.20	Labour for laying in position double socket cast iron 11¼° bends.			
1.20.1	80mm diameter	Each	NA	20.00
1.20.2	100mm diameter	Each	24.00	25.00
1.20.3	125mm diameter	Each	31.00	33.00
1.20.4	150mm diameter	Each	41.00	42.00
1.20.5	200mm diameter	Each	60.00	63.00
1.20.6	250mm diameter	Each	85.00	88.00
1.20.7	300mm diameter	Each	113.00	117.00
1.20.8	350mm diameter	Each	144.00	151.00
1.20.9	400mm diameter	Each	181.00	189.00
1.20.10	450mm diameter	Each	215.00	225.00
1.20.11	500mm diameter	Each	268.00	282.00
1.20.12	600mm diameter	Each	376.00	396.00
1.20.13	700mm diameter	Each	506.00	534.00
1.20.14	750mm diameter	Each	580.00	614.00
1.20.15	800mm diameter	Each	656.00	699.00
1.20.16	900mm diameter	Each	840.00	893.00
1.20.17	1000mm diameter	Each	1048.00	1116.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
1.21	Labour for laying in position all socket cast iron, tees (all Sizes in mm).			
1.21.1	80x80	Each	29.00	30.00
1.21.2	100x80	Each	35.00	37.00
1.21.3	100x100	Each	38.00	39.00
1.21.4	125x80	Each	45.00	47.00
1.21.5	125x100	Each	47.00	50.00
1.21.6	125x125	Each	51.00	54.00
1.21.7	150x80	Each	56.00	59.00
1.21.8	150x100	Each	59.00	62.00
1.21.9	150x125	Each	62.00	65.00
1.21.10	150x150	Each	65.00	69.00
1.21.11	200x80	Each	83.00	88.00
1.21.12	200x100	Each	85.00	90.00
1.21.13	200x125	Each	88.00	93.00
1.21.14	200x150	Each	92.00	97.00
1.21.15	200x200	Each	101.00	106.00
1.21.16	250x80	Each	115.00	123.00
1.21.17	250x100	Each	118.00	126.00
1.21.18	250x125	Each	122.00	130.00
1.21.19	250x150	Each	126.00	134.00
1.21.20	250x200	Each	134.00	141.00
1.21.21	250x250	Each	143.00	152.00
1.21.22	300x80	Each	156.00	168.00
1.21.23	300x100	Each	157.00	169.00
1.21.24	300x125	Each	161.00	173.00
1.21.25	300x150	Each	164.00	176.00
1.21.26	300x200	Each	174.00	186.00
1.21.27	300x250	Each	183.00	196.00
1.21.28	300x300	Each	195.00	208.00
1.21.29	350x200	Each	221.00	238.00
1.21.30	350x250	Each	232.00	249.00
1.21.31	350x300	Each	244.00	261.00
1.21.32	350x350	Each	255.00	274.00
1.21.33	400x200	Each	278.00	300.00
1.21.34	400x250	Each	288.00	310.00
1.21.35	400x300	Each	299.00	322.00
1.21.36	400x350	Each	312.00	335.00
1.21.37	400x400	Each	327.00	351.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.21.38	450x250	Each	359.00	386.00
1.21.39	450x300	Each	371.00	398.00
1.21.40	450x350	Each	384.00	411.00
1.21.41	450x400	Each	397.00	424.00
1.21.42	450x450	Each	413.00	441.00
1.21.43	500x250	Each	428.00	466.00
1.21.44	500x300	Each	440.00	478.00
1.21.45	500x350	Each	453.00	491.00
1.21.46	500x400	Each	466.00	506.00
1.21.47	500x450	Each	482.00	521.00
1.21.48	500x500	Each	500.00	541.00
1.21.49	600x300	Each	623.00	682.00
1.21.50	600x350	Each	637.00	695.00
1.21.51	600x400	Each	652.00	711.00
1.21.52	600x450	Each	668.00	728.00
1.21.53	600x500	Each	685.00	745.00
1.21.54	600x600	Each	726.00	788.00
1.21.55	700x350	Each	875.00	955.00
1.21.56	700x400	Each	891.00	972.00
1.21.57	700x450	Each	908.00	990.00
1.21.58	700x500	Each	925.00	1007.00
1.21.59	700x600	Each	960.00	1041.00
1.21.60	700x700	Each	1006.00	1090.00
1.21.61	750x400	Each	1023.00	1120.00
1.21.62	750x450	Each	1041.00	1138.00
1.21.63	750x500	Each	1060.00	1158.00
1.21.64	750x600	Each	1095.00	1193.00
1.21.65	750x700	Each	1136.00	1234.00
1.21.66	750x750	Each	1164.00	1264.00
1.21.67	800x400	Each	1174.00	1286.00
1.21.68	800x450	Each	1191.00	1304.00
1.21.69	800x500	Each	1209.00	1323.00
1.21.70	800x600	Each	1248.00	1362.00
1.21.71	800x700	Each	1289.00	1404.00
1.21.72	800x750	Each	1310.00	1426.00
1.21.73	800x800	Each	1341.00	1459.00
1.21.74	900x450	Each	1532.00	1687.00
1.21.75	900x500	Each	1551.00	1705.00
1.21.76	900x600	Each	1594.00	1751.00
1.21.77	900x700	Each	1638.00	1796.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.21.78	900x750	Each	1659.00	1818.00
1.21.79	900x800	Each	1683.00	1840.00
1.21.80	900x900	Each	1743.00	1903.00
1.21.81	1000x500	Each	1955.00	2158.00
1.21.82	1000x600	Each	1997.00	2202.00
1.21.83	1000x700	Each	2050.00	2257.00
1.21.84	1000x750	Each	2072.00	2280.00
1.21.85	1000x800	Each	2097.00	2304.00
1.21.86	1000x900	Each	2147.00	2354.00
1.21.87	1000x1000	Each	2217.00	2426.00
1.22	Labour for laying in position all socket cast iron crosses. (all sizes in mm.		Medium Class	Heavy Class
1.22.1	80mm diameter	Each	38.00	39.00
1.22.2	100mm diameter	Each	48.00	51.00
1.22.3	125mm diameter	Each	65.00	68.00
1.22.4	150mm diameter	Each	84.00	88.00
1.22.5	200mm diameter	Each	127.00	134.00
1.22.6	250mm diameter	Each	179.00	190.00
1.22.7	300mm diameter	Each	244.00	258.00
1.23	Labour for laying in position socket and spigot cast iron tapers, (reducer) (all Sizes in mm).		Medium Class	Heavy Class
1.23.1	100x80	Each	20.00	21.00
1.23.2	125x80	Each	26.00	28.00
1.23.3	125x100	Each	28.00	30.00
1.23.4	150x80	Each	33.00	35.00
1.23.5	150x100	Each	34.00	37.00
1.23.6	150x125	Each	38.00	41.00
1.23.7	200x100	Each	48.00	52.00
1.23.8	200x125	Each	51.00	55.00
1.23.9	200x150	Each	55.00	59.00
1.23.10	250x125	Each	69.00	73.00
1.23.11	250x150	Each	72.00	77.00
1.23.12	250x200	Each	80.00	86.00
1.23.13	300x150	Each	97.00	105.00
1.23.14	300x200	Each	106.00	115.00
1.23.15	300x250	Each	115.00	127.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.23.16	350x200	Each	126.00	136.00
1.23.17	350x250	Each	136.00	148.00
1.23.18	350x300	Each	147.00	161.00
1.23.19	400x250	Each	172.00	187.00
1.23.20	400x300	Each	185.00	202.00
1.23.21	400x350	Each	198.00	217.00
1.23.22	450x350	Each	221.00	242.00
1.23.23	450x400	Each	237.00	261.00
1.23.24	500x350	Each	254.00	276.00
1.23.25	500x400	Each	270.00	295.00
1.23.26	500x450	Each	287.00	314.00
1.23.27	600x400	Each	360.00	393.00
1.23.28	600x450	Each	379.00	414.00
1.23.29	600x500	Each	398.00	436.00
1.23.30	700x500	Each	478.00	521.00
1.23.31	700x600	Each	523.00	572.00
1.23.32	750x600	Each	588.00	644.00
1.23.33	750x700	Each	642.00	706.00
1.23.34	800x600	Each	635.00	694.00
1.23.35	800x700	Each	688.00	756.00
1.23.36	800x750	Each	718.00	790.00
1.23.37	900x700	Each	823.00	898.00
1.23.38	900x750	Each	853.00	972.00
1.23.39	900x800	Each	884.00	934.00
1.23.40	1000x800	Each	1003.00	1096.00
1.23.41	1000x900	Each	1071.00	1176.00
1.24	Labour for laying in position Double Socket cast iron tapers (Reducer) (all sizes in mm).		Medium Class	Heavy Class
1.24.1	100x80	Each	20.00	24.00
1.24.2	125x80	Each	26.00	35.00
1.24.3	125x100	Each	28.00	39.00
1.24.4	150x80	Each	33.00	41.00
1.24.5	150x100	Each	34.00	45.00
1.24.6	150x125	Each	37.00	50.00
1.24.7	200x100	Each	48.00	56.00
1.24.8	200x125	Each	51.00	62.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.24.9	200x150	Each	55.00	67.00
1.24.10	250x125	Each	69.00	76.00
1.24.11	250x150	Each	72.00	81.00
1.24.12	250x200	Each	80.00	94.00
1.24.13	300x150	Each	97.00	98.00
1.24.14	300x200	Each	106.00	110.00
1.24.15	300x250	Each	115.00	124.00
1.24.16	350x200	Each	126.00	153.00
1.24.17	350x250	Each	136.00	172.00
1.24.18	350x300	Each	147.00	191.00
1.24.19	400x250	Each	172.00	195.00
1.24.20	400x300	Each	185.00	215.00
1.24.21	400x350	Each	198.00	237.00
1.24.22	450x350	Each	221.00	255.00
1.24.23	450x400	Each	237.00	279.00
1.24.24	500x350	Each	254.00	291.00
1.24.25	500x400	Each	270.00	316.00
1.24.26	500x450	Each	287.00	335.00
1.24.27	600x400	Each	360.00	393.00
1.24.28	600x450	Each	379.00	406.00
1.24.29	600x500	Each	398.00	435.00
1.24.30	700x500	Each	478.00	508.00
1.24.31	700x600	Each	523.00	572.00
1.24.32	750x600	Each	588.00	616.00
1.24.33	750x700	Each	642.00	684.00
1.24.34	800x600	Each	597.00	656.00
1.24.35	800x700	Each	661.00	730.00
1.24.36	800x750	Each	701.00	773.00
1.24.37	900x700	Each	748.00	824.00
1.24.38	900x750	Each	790.00	909.00
1.24.39	900x800	Each	857.00	906.00
1.24.40	1000x800	Each	918.00	1011.00
1.24.41	1000x900	Each	999.00	1104.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
1.25	Labour for laying in position cast Iron Collars.		Medium Class	Heavy Class
1.25.1	80mm diameter	Each	17.00	18.00
1.25.2	100mm diameter	Each	21.00	22.00
1.25.3	125mm diameter	Each	28.00	29.00
1.25.4	150mm diameter	Each	35.00	37.00
1.25.5	200mm diameter	Each	50.00	52.00
1.25.6	250mm diameter	Each	68.00	72.00
1.25.7	300mm diameter	Each	89.00	93.00
1.25.8	350mm diameter	Each	113.00	118.00
1.25.9	400mm diameter	Each	135.00	144.00
1.25.10	450mm diameter	Each	166.00	174.00
1.25.11	500mm diameter	Each	198.00	208.00
1.25.12	600mm diameter	Each	268.00	283.00
1.25.13	700mm diameter	Each	352.00	371.00
1.25.14	750mm diameter	Each	398.00	419.00
1.25.15	800mm diameter	Each	447.00	472.00
1.25.16	900mm diameter	Each	555.00	587.00
1.25.17	1000mm diameter	Each	678.00	716.00
1.26	Labour for laying in position socketed cast iron caps.			Heavy Class
1.26.1	80mm diameter	Each		9.00
1.26.2	100mm diameter	Each		12.00
1.26.3	125mm diameter	Each		16.00
1.26.4	150mm diameter	Each		20.00
1.26.5	200mm diameter	Each		31.00
1.26.6	250mm diameter	Each		45.00
1.26.7	300mm diameter	Each		60.00
1.26.8	350mm diameter	Each		80.00
1.26.9	400mm diameter	Each		101.00
1.26.10	450mm diameter	Each		127.00
1.26.11	500mm diameter	Each		155.00
1.26.12	600mm diameter	Each		224.00
1.26.13	700mm diameter	Each		308.00
1.26.14	750mm diameter	Each		356.00
1.26.15	800mm diameter	Each		411.00
1.26.16	900mm diameter	Each		530.00
1.26.17	1000mm diameter	Each		673.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
1.27	Labour for laying in position cast iron plugs.			
1.27.1	80mm diameter	Each	3.00	4.00
1.27.2	100mm diameter	Each	4.00	5.00
1.27.3	125mm diameter	Each	7.00	8.00
1.27.4	150mm diameter	Each	10.00	12.00
1.27.5	200mm diameter	Each	17.00	18.00
1.27.6	250mm diameter	Each	26.00	29.00
1.27.7	300mm diameter	Each	37.00	39.00
1.27.8	350mm diameter	Each	50.00	54.00
1.27.9	400mm diameter	Each	67.00	71.00
1.27.10	450mm diameter	Each	85.00	90.00
1.27.11	500mm diameter	Each	106.00	113.00
1.27.12	600mm diameter	Each	157.00	166.00
1.27.13	700mm diameter	Each	224.00	236.00
1.27.14	750mm diameter	Each	263.00	276.00
1.27.15	800mm diameter	Each	308.00	322.00
1.27.16	900mm diameter	Each	402.00	420.00
1.27.17	1000mm diameter	Each	516.00	538.00
1.28	Labour for laying in position sizes of socket & spigot or all socketed cast iron standard specials class 'MEDIUM' or 'HEAVY' Which do not appear in above items of the schedule.			
			Medium Class	Heavy Class
1.28.1	80 mm to 1000 mm Dia	Kg	1.00	1.00

CHAPTER - 2

CAST IRON SOCKET AND SPIGOT PIPES AND SPECIALS WITH TYTON JOINTS

- 1 C.I. Pipes shall conform to IS: IS: 1536 - 2001(Reaffirmation year 2016) duly inspected and tested and having BIS certification mark.
- 2 Specials shall conform to IS: IS 1538 - 1993(Reaffirmation year 2018) duly inspected and tested and having BIS certification mark.
- 3 Tyton rubber sealing ring/Tyton rubber gasket shall be as per IS 5382- 2018 and ISI marked.
- 4 The rings shall be homogeneous, free from porosity, frit, excessive blooms, blisters or other visible surface imperfections. The fin or flash shall be reduce as much possible and in any case the thickness of it shall not exceed 0.4 mm and the width 0.8 mm. Unless otherwise specified, the materials shall be black.
- 5 Rubber ring tyton joints shall be used for jointing of CI pipe lines outside the building and other external water supply installations. Wherever required, for internal water supply piping arrangements with CI pipes, shall be connected by flanged joints.

- 6 Laying of pipe shall be as per clause IS:3114 - 1994(Reaffirmation year 2019)
Laying of pipes and fittings/specials includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/ specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.
- 7 **Measurement**
 - (a) The net length of pipes as laid or fixed should be measured in running meters correct to a cm. Specials should be excluded and enumerated and paid separately. The portion of the pipe within the collar at the joints shall not be included in the length of pipe work.
 - (b) C.I. Pipe are designated by Inner dia meter.

- 8 **Rates**
 - a) The rates include charges for all tools & plants, chain pulley blocks, other appliances etc. required for lifting and laying the pipes and specials in positions as per approved drawing.
 - b) The rates include provision and use of all coverings etc. to protect the works from inclement weather etc. and from damages from fall of materials, and other causes.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Codes & CPHEEO Manual)

CHAPTER 2- CAST IRON SOCKET, SPIGOT PIPES AND SPECIALS WITH TYTON JOINTS

S.No.	Particulars of Items	Unit	Rates (in Rs.)		
			LA Class	A Class	B Class
2.1	Providing, laying and jointing cast iron pipes with tyton joints including testing of joints, cost of pipes and jointing materials etc complete.		LA Class	A Class	B Class
2.1.1	80mm diameter	Meter	1273.00	1381.00	1481.00
2.1.2	100mm diameter	Meter	1564.00	1692.00	1804.00
2.1.3	125mm diameter	Meter	1942.00	2118.00	2316.00
2.1.4	150mm diameter	Meter	2348.00	2568.00	2763.00
2.1.5	200mm diameter	Meter	3426.00	3713.00	4012.00
2.1.6	250mm diameter	Meter	4611.00	5034.00	5379.00
2.1.7	300mm diameter	Meter	5955.00	6499.00	7032.00
2.1.8	350mm diameter	Meter	7494.00	8117.00	8788.00
2.1.9	400mm diameter	Meter	9146.00	9979.00	10759.00
2.1.10	450mm diameter	Meter	11224.00	11269.00	13260.00
2.1.11	500mm diameter	Meter	13143.00	14295.00	15446.00
2.1.12	600mm diameter	Meter	17450.00	19019.00	20573.00
2.1.13	700mm diameter	Meter	22523.00	24566.00	26505.00
2.1.14	750mm diameter	Meter	25225.00	27533.00	29827.00
2.1.15	800mm diameter	Meter	28236.00	30714.00	33179.00
2.1.16	900mm diameter	Meter	34377.00	37448.00	40520.00
2.1.17	1000mm diameter	Meter	40924.00	45062.00	48634.00
2.2	Labour for laying in position cast iron pipes.		LA Class	A Class	B Class
2.2.1	80mm diameter	Meter	12.00	13.00	14.00
2.2.2	100mm diameter	Meter	15.00	16.00	18.00
2.2.3	125mm diameter	Meter	20.00	21.00	23.00
2.2.4	150mm diameter	Meter	24.00	27.00	28.00
2.2.5	200mm diameter	Meter	36.00	39.00	41.00
2.2.6	250mm diameter	Meter	49.00	53.00	57.00
2.2.7	300mm diameter	Meter	63.00	68.00	74.00
2.2.8	350mm diameter	Meter	80.00	87.00	93.00
2.2.9	400mm diameter	Meter	97.00	106.00	113.00
2.2.10	450mm diameter	Meter	118.00	129.00	138.00
2.2.11	500mm diameter	Meter	137.00	148.00	159.00
2.2.12	600mm diameter	Meter	185.00	200.00	216.00
2.2.13	700mm diameter	Meter	235.00	254.00	273.00
2.2.14	750mm diameter	Meter	260.00	282.00	304.00
2.2.15	800mm diameter	Meter	289.00	313.00	337.00
2.2.16	900mm diameter	Meter	357.00	387.00	417.00
2.2.17	1000mm diameter	Meter	432.00	469.00	503.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
2.3	Jointing of CI pipes of tyton joints of class 'LA' 'A' and 'B' including testing of joints and cost of jointing materials (i.e. tyton Rubber Gasket and Soap solution etc.).		
2.3.1	80mm diameter	Each	49.00
2.3.2	100mm diameter	Each	51.00
2.3.3	125mm diameter	Each	76.00
2.3.4	150mm diameter	Each	81.00
2.3.5	200mm diameter	Each	117.00
2.3.6	250mm diameter	Each	160.00
2.3.7	300mm diameter	Each	207.00
2.3.8	350mm diameter	Each	237.00
2.3.9	400mm diameter	Each	320.00
2.3.10	450mm diameter	Each	356.00
2.3.11	500mm diameter	Each	448.00
2.3.12	600mm diameter	Each	582.00
2.3.13	700mm diameter	Each	799.00
2.3.14	750mm diameter	Each	906.00
2.3.15	800mm diameter	Each	1021.00
2.3.16	900mm diameter	Each	1139.00
2.3.17	1000mm diameter	Each	1444.00
2.4	Labour for jointing of CI pipes class 'LA' 'A' and 'B' including testing of joints but excluding cost of tyton Rubber Gasket.		
2.4.1	80mm diameter	Each	13.00
2.4.2	100mm diameter	Each	13.00
2.4.3	125mm diameter	Each	26.00
2.4.4	150mm diameter	Each	26.00
2.4.5	200mm diameter	Each	35.00
2.4.6	250mm diameter	Each	43.00
2.4.7	300mm diameter	Each	52.00
2.4.8	350mm diameter	Each	52.00
2.4.9	400mm diameter	Each	69.00
2.4.10	450mm diameter	Each	77.00
2.4.11	500mm diameter	Each	81.00
2.4.12	600mm diameter	Each	111.00
2.4.13	700mm diameter	Each	131.00
2.4.14	750mm diameter	Each	135.00
2.4.15	800mm diameter	Each	143.00
2.4.16	900mm diameter	Each	168.00
2.4.17	1000mm diameter	Each	185.00

CHAPTER - 3

CAST IRON PIPES AND SPECIALS WITH FLANGED JOINTS

- 1 The Horizontal C.I. double flanged pipes shall conform to IS 7181-1986 (reaffirmed 2014 duly inspected and tested and having BIS certification mark.
- 2 The C.I. fittings shall conform to IS - 1538- 1993 (Reaffirmation year 2018) duly inspected and tested and having BIS certification mark.
- 3 Method of sampling of cast iron pipes & fittings shall conform to IS 11606-1986.(Reaffirmation year 2014)
- 4 Specification for rubber insertions shall conform to IS 638: 1979.
- 5 General construction in steel (for nuts and bolts) shall conform to IS 800:2007(Reaffirmation year 2017)
- 6 Flanged pipes centrifugally cast with screwed/welded flanges shall conform to IS 1536-2001(Reaffirmation year 2014). Few manufactures purchase pipes from other pipe manufacturers & only fix the flanges to make it double flange. Hence this shall be excepted only from those manufactures, having valid BIS licence for doing this job & put the BIS marking authority.
- 7 Laying of pipes and fittings/specials includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.
- 8 **Fixing** means laying in specified position to ensure interconnection between all flanged pipes, fittings and valves. It is also to ensure that the bolt holes of two flanges of the pipe/ fittings are correctly aligned.
- 9 **Measurement :**
 - (a) The net length of pipes as laid or fixed should be measured in running meters correct to a cm. Specials should be excluded and enumerated and paid for separately. The portion of the pipe within the collar at the joints should not be included in the length of pipe work.
 - (b) C.I. Pipe are designated by Inner diameter.

10 Rates :

(i) The rates includes the charges for all tools and plant such as chain pulley blocks and other appliances etc. required for lifting and laying the pipes and specials in position.

(ii) The rates include provision and use of all coverings etc. to protect the works from inclement weather etc. and from damages from fall of materials and other causes.

(iii) The rates include provision of handling, storing under cover as required and returning of empty cases or container to the store without any extra cost, for such materials as may be supplied by the Department.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 3 -CAST IRON PIPES AND SPECIALS WITH FLANGED JOINTS

S.No.	Particulars of Items	Unit	Rates (in Rs.)
3.1	Providing, fixing, laying & testing of double flanged cast iron (horizontal cast) pipe as per IS : 7181 of <u>One Meter</u> length.		
3.1.1	80mm diameter	Each	1987.00
3.1.2	100mm diameter	Each	2469.00
3.1.3	125mm diameter	Each	3192.00
3.1.4	150mm diameter	Each	3725.00
3.1.5	200mm diameter	Each	5331.00
3.1.6	250mm diameter	Each	7159.00
3.1.7	300mm diameter	Each	9181.00
3.1.8	350mm diameter	Each	12528.00
3.1.9	400mm diameter	Each	15296.00
3.1.10	450mm diameter	Each	18263.00
3.1.11	500mm diameter	Each	21438.00
3.1.12	600mm diameter	Each	28820.00
3.1.13	700mm diameter	Each	37549.00
3.1.14	750mm diameter	Each	42592.00
3.2	Labour only for fixing (testing) including positioning of pipe, cleaning of pipes/flange ends, local carriage for pipe at site etc. double flanged cast iron (horizontal cast) pipe as per IS : 7181 of One Meter length.		
3.2.1	80mm diameter	Each	52.00
3.2.2	100mm diameter	Each	64.00
3.2.3	125mm diameter	Each	83.00
3.2.4	150mm diameter	Each	97.00
3.2.5	200mm diameter	Each	139.00
3.2.6	250mm diameter	Each	186.00
3.2.7	300mm diameter	Each	238.00
3.2.8	350mm diameter	Each	326.00
3.2.9	400mm diameter	Each	398.00
3.2.10	450mm diameter	Each	476.00
3.2.11	500mm diameter	Each	558.00
3.2.12	600mm diameter	Each	750.00
3.2.13	700mm diameter	Each	978.00
3.2.14	750mm diameter	Each	1109.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
3.3	Providing, fixing (laying) & testing of double flanged cast iron (horizontal cast) pipe as per IS : 7181 of Two Meter length.		
3.3.1	80mm diameter	Each	3378.00
3.3.2	100mm diameter	Each	4254.00
3.3.3	125mm diameter	Each	5518.00
3.3.4	150mm diameter	Each	6539.00
3.3.5	200mm diameter	Each	9369.00
3.3.6	250mm diameter	Each	12793.00
3.3.7	300mm diameter	Each	16586.00
3.3.8	350mm diameter	Each	21921.00
3.3.9	400mm diameter	Each	26736.00
3.3.10	450mm diameter	Each	32129.00
3.3.11	500mm diameter	Each	37572.00
3.3.12	600mm diameter	Each	50387.00
3.3.13	700mm diameter	Each	65278.00
3.3.14	750mm diameter	Each	73794.00
3.4	Labour only for fixing (laying) & testing double flanged cast iron (horizontal cast) pipe as per IS : 7181 of Two Meter length.		
3.4.1	80mm diameter	Each	89.00
3.4.2	100mm diameter	Each	113.00
3.4.3	125mm diameter	Each	146.00
3.4.4	150mm diameter	Each	173.00
3.4.5	200mm diameter	Each	247.00
3.4.6	250mm diameter	Each	339.00
3.4.7	300mm diameter	Each	437.00
3.4.8	350mm diameter	Each	580.00
3.4.9	400mm diameter	Each	708.00
3.4.10	450mm diameter	Each	850.00
3.4.11	500mm diameter	Each	994.00
3.4.12	600mm diameter	Each	1333.00
3.4.13	700mm diameter	Each	1728.00
3.4.14	750mm diameter	Each	1954.00
3.5	Providing, fixing (laying) & testing of double flanged cast iron (horizontal cast) pipe as per IS : 7181 of 2.75 Meter length.		
3.5.1	80mm diameter	Each	4412.00
3.5.2	100mm diameter	Each	5580.00
3.5.3	125mm diameter	Each	7240.00
3.5.4	150mm diameter	Each	8678.00
3.5.5	200mm diameter	Each	12428.00
3.5.6	250mm diameter	Each	16893.00
3.5.7	300mm diameter	Each	22124.00
3.5.8	350mm diameter	Each	28877.00
3.5.9	400mm diameter	Each	35212.00
3.5.10	450mm diameter	Each	42402.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
3.5.11	500mm diameter	Each	49523.00
3.5.12	600mm diameter	Each	66363.00
3.5.13	700mm diameter	Each	85817.00
3.5.14	750mm diameter	Each	96911.00
3.6	Labour only for fixing (laying) & testing double flanged cast iron (horizontal cast) pipe as per IS : 7181 of 2.75 Meter length.		
3.6.1	80mm diameter	Each	118.00
3.6.2	100mm diameter	Each	149.00
3.6.3	125mm diameter	Each	193.00
3.6.4	150mm diameter	Each	230.00
3.6.5	200mm diameter	Each	331.00
3.6.6	250mm diameter	Each	451.00
3.6.7	300mm diameter	Each	590.00
3.6.8	350mm diameter	Each	771.00
3.6.9	400mm diameter	Each	940.00
3.6.10	450mm diameter	Each	1131.00
3.6.11	500mm diameter	Each	1322.00
3.6.12	600mm diameter	Each	1771.00
3.6.13	700mm diameter	Each	2290.00
3.6.14	750mm diameter	Each	2587.00
3.7	Jointing of double flanged cast iron (horizontal cast) pipes and specials class 'A' and 'B' including labour & cost of jointing materials (i.e. Bolt, Nuts and Rubber insertions) including testing of joint etc. complete [Conform to IS 800 Nuts & Bolts & IS 1638 rubber insertions:]		
3.7.1	80mm diameter	Each	112.00
3.7.2	100mm diameter	Each	187.00
3.7.3	125mm diameter	Each	197.00
3.7.4	150mm diameter	Each	207.00
3.7.5	200mm diameter	Each	217.00
3.7.6	250mm diameter	Each	298.00
3.7.7	300mm diameter	Each	301.00
3.7.8	350mm diameter	Each	378.00
3.7.9	400mm diameter	Each	392.00
3.7.10	450mm diameter	Each	426.00
3.7.11	500mm diameter	Each	429.00
3.7.12	600mm diameter	Each	488.00
3.7.13	700mm diameter	Each	559.00
3.7.14	750mm diameter	Each	649.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.8	Labour for jointing of flanged cast iron pipes and specials class 'A' and 'B' including testing of joints but excluding cost of jointing materials (i.e. Bolts & Nut, Rubber insertion)			
3.8.1	80mm diameter	Each	36.00	
3.8.2	100mm diameter	Each	50.00	
3.8.3	125mm diameter	Each	60.00	
3.8.4	150mm diameter	Each	70.00	
3.8.5	200mm diameter	Each	80.00	
3.8.6	250mm diameter	Each	100.00	
3.8.7	300mm diameter	Each	104.00	
3.8.8	350mm diameter	Each	120.00	
3.8.9	400mm diameter	Each	134.00	
3.8.10	450mm diameter	Each	137.00	
3.8.11	500mm diameter	Each	140.00	
3.8.12	600mm diameter	Each	154.00	
3.8.13	700mm diameter	Each	164.00	
3.8.14	750mm diameter	Each	178.00	
3.9	Labour only for jointing double flanged horizontally cast iron pipes and specials in vertical or inclined direction including testing of joints but excluding cost of jointing materials (i.e. bolts, nuts and rubber insertion sheet) [Conform to IS 800 IS 1638:]			
3.9.1	80mm to 750mm dia in truly vertical position		200% above the rates provided vide item No. 3.2, 3.4 & 3.6	
3.9.2	In inclined position at inclination 45% & above		100% above rates provided vide item No. 3.2, 3.4 & 3.6	
3.9.3	In inclined position at inclination less than 45%		Same as rates provided vide item No. 3.2, 3.4 & 3.6	
3.10	Providing & Laying in position cast iron flanged sockets		Medium Class	Heavy Class
3.10.1	80mm diameter	Each	868.00	941.00
3.10.2	100mm diameter	Each	1085.00	1158.00
3.10.3	125mm diameter	Each	1375.00	1447.00
3.10.4	150mm diameter	Each	1809.00	1881.00
3.10.5	200mm diameter	Each	2605.00	2677.00
3.10.6	250mm diameter	Each	4197.00	4486.00
3.10.7	300mm diameter	Each	5354.00	5716.00
3.10.8	350mm diameter	Each	7289.00	7754.00
3.10.9	400mm diameter	Each	8995.00	9538.00
3.10.10	450mm diameter	Each	10391.00	11011.00
3.10.11	500mm diameter	Each	12639.00	13415.00
3.10.12	600mm diameter	Each	17137.00	18145.00
3.10.13	700mm diameter	Each	22409.00	23728.00
3.10.14	750mm diameter	Each	25434.00	26907.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.11	Providing and laying in position cast iron flanged spigot (tail piece)		Medium Class	Heavy Class
3.11.1	80mm diameter	Each	796.00	868.00
3.11.2	100mm diameter	Each	941.00	1013.00
3.11.3	125mm diameter	Each	1230.00	1375.00
3.11.4	150mm diameter	Each	1519.00	1664.00
3.11.5	200mm diameter	Each	2532.00	2822.00
3.11.6	250mm diameter	Each	3401.00	3835.00
3.11.7	300mm diameter	Each	4341.00	4920.00
3.11.8	350mm diameter	Each	5893.00	6591.00
3.11.9	400mm diameter	Each	7134.00	8064.00
3.11.10	450mm diameter	Each	8452.00	9538.00
3.11.11	500mm diameter	Each	10080.00	11321.00
3.11.12	600mm diameter	Each	15586.00	17602.00
3.11.13	700mm diameter	Each	20238.00	22875.00
3.11.14	750mm diameter	Each	22952.00	25899.00
3.12	Providing and laying in position cast iron double flanged 90° bends		Medium Class	Heavy Class
3.12.1	80mm diameter	Each	888.00	962.00
3.12.2	100mm diameter	Each	1185.00	1259.00
3.12.3	125mm diameter	Each	1555.00	1703.00
3.12.4	150mm diameter	Each	2147.00	2295.00
3.12.5	200mm diameter	Each	3332.00	3628.00
3.12.6	250mm diameter	Each	4812.00	5331.00
3.12.7	300mm diameter	Each	6663.00	7404.00
3.12.8	350mm diameter	Each	9508.00	10590.00
3.12.9	400mm diameter	Each	12523.00	13992.00
3.12.10	450mm diameter	Each	15538.00	17470.00
3.12.11	500mm diameter	Each	19944.00	22418.00
3.12.12	600mm diameter	Each	30303.00	34168.00
3.12.13	700mm diameter	Each	43753.00	49396.00
3.12.14	750mm diameter	Each	51638.00	58363.00
3.13	Providing and laying in position cast iron double flanged 45° bends		Heavy Class	
3.13.1	80mm diameter	Each	1037.00	
3.13.2	100mm diameter	Each	1333.00	
3.13.3	125mm diameter	Each	1851.00	
3.13.4	150mm diameter	Each	2517.00	
3.13.5	200mm diameter	Each	3998.00	
3.13.6	250mm diameter	Each	5923.00	
3.13.7	300mm diameter	Each	8292.00	
3.13.8	350mm diameter	Each	8890.00	
3.13.9	400mm diameter	Each	11518.00	
3.13.10	450mm diameter	Each	14301.00	
3.13.11	500mm diameter	Each	17857.00	
3.13.12	600mm diameter	Each	26438.00	
3.13.13	700mm diameter	Each	37492.00	
3.13.14	750mm diameter	Each	44217.00	

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.14	Providing and laying in position cast iron double flanged 90° Duck Foot Bend.		Medium Class	Heavy Class
3.14.1	80mm diameter	Each	1483.00	1557.00
3.14.2	100mm diameter	Each	1853.00	1928.00
3.14.3	125mm diameter	Each	2521.00	2669.00
3.14.4	150mm diameter	Each	3336.00	3484.00
3.14.5	200mm diameter	Each	5190.00	5486.00
3.14.6	250mm diameter	Each	7710.00	8229.00
3.14.7	300mm diameter	Each	10824.00	11566.00
3.14.8	350mm diameter	Each	15780.00	16884.00
3.14.9	400mm diameter	Each	20671.00	22170.00
3.14.10	450mm diameter	Each	25642.00	27614.00
3.14.11	500mm diameter	Each	32664.00	35188.00
3.14.12	600mm diameter	Each	49469.00	53414.00
3.15	Providing and laying in position cast iron all flanged Tees (all sizes in mm) Body x Branch.		Medium Class	Heavy Class
3.15.1	80x80	Each	1521.00	1597.00
3.15.2	100x80	Each	1749.00	1901.00
3.15.3	100x100	Each	1825.00	1977.00
3.15.4	125x80	Each	2205.00	2433.00
3.15.5	125x100	Each	2433.00	2586.00
3.15.6	125x125	Each	2510.00	2738.00
3.15.7	150x80	Each	2890.00	3118.00
3.15.8	150x100	Each	2966.00	3194.00
3.15.9	150x125	Each	3118.00	3422.00
3.15.10	150x150	Each	3270.00	3574.00
3.15.11	200x80	Each	4259.00	4715.00
3.15.12	200x100	Each	4335.00	4791.00
3.15.13	200x125	Each	4563.00	5019.00
3.15.14	200x150	Each	4715.00	5171.00
3.15.15	200x200	Each	5095.00	5627.00
3.15.16	250x80	Each	6084.00	6768.00
3.15.17	250x100	Each	6160.00	6844.00
3.15.18	250x125	Each	6388.00	7072.00
3.15.19	250x150	Each	6616.00	7300.00
3.15.20	250x200	Each	6996.00	7757.00
3.15.21	250x250	Each	7529.00	8289.00
3.15.22	300x80	Each	8289.00	9278.00
3.15.23	300x100	Each	8441.00	9430.00
3.15.24	300x125	Each	8593.00	9582.00
3.15.25	300x150	Each	8821.00	9810.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.15.26	300x200	Each	9278.00	10342.00
3.15.27	300x250	Each	9810.00	10875.00
3.15.28	300x300	Each	10342.00	11483.00
3.15.29	350x200	Each	11786.00	13104.00
3.15.30	350x250	Each	12096.00	13415.00
3.15.31	350x300	Each	13182.00	14578.00
3.15.32	350x350	Each	13570.00	15121.00
3.15.33	400x200	Each	14655.00	16361.00
3.15.34	400x250	Each	14965.00	16671.00
3.15.35	400x300	Each	16129.00	17990.00
3.15.36	400x350	Each	16594.00	18532.00
3.15.37	400x400	Each	17137.00	19075.00
3.15.38	450x250	Each	17990.00	20161.00
3.15.39	450x300	Each	19153.00	21479.00
3.15.40	450x350	Each	19618.00	22022.00
3.15.41	450x400	Each	20083.00	22487.00
3.15.42	450x450	Each	20548.00	22952.00
3.15.43	500x250	Each	21789.00	24425.00
3.15.44	500x300	Each	23107.00	25899.00
3.15.45	500x350	Each	23650.00	26519.00
3.15.46	500x400	Each	24193.00	27062.00
3.15.47	500x450	Each	24658.00	27605.00
3.15.48	500x500	Each	25201.00	28147.00
3.15.49	600x300	Each	32102.00	36134.00
3.15.50	600x350	Each	32877.00	36832.00
3.15.51	600x400	Each	33498.00	37608.00
3.15.52	600x450	Each	33963.00	38150.00
3.15.53	600x500	Each	34506.00	38693.00
3.15.54	600x600	Each	35747.00	40011.00
3.15.55	700x350	Each	44199.00	49781.00
3.15.56	700x400	Each	44819.00	50479.00
3.15.57	700x450	Each	45517.00	51177.00
3.15.58	700x500	Each	46137.00	51875.00
3.15.59	700x600	Each	47378.00	53193.00
3.15.60	700x700	Each	49006.00	54822.00
3.15.61	750x400	Each	51332.00	57846.00
3.15.62	750x450	Each	51953.00	58466.00
3.15.63	750x500	Each	52806.00	59397.00
3.15.64	750x600	Each	53814.00	60405.00
3.15.65	750x700	Each	54822.00	61413.00
3.15.66	750x750	Each	55830.00	62421.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.15.67	800x400	Each	59086.00	66530.00
3.15.68	800x450	Each	59707.00	67228.00
3.15.69	800x500	Each	60405.00	68004.00
3.15.70	800x600	Each	61878.00	69555.00
3.15.71	800x700	Each	63351.00	71028.00
3.15.72	800x750	Each	64204.00	71958.00
3.15.73	800x800	Each	65212.00	72966.00
3.15.74	900x450	Each	74905.00	84598.00
3.15.75	900x500	Each	75990.00	85761.00
3.15.76	900x600	Each	77541.00	87467.00
3.15.77	900x700	Each	79092.00	89095.00
3.15.78	900x750	Each	80023.00	90025.00
3.15.79	900x800	Each	80953.00	90956.00
3.15.80	900x900	Each	82271.00	92274.00
3.16	Providing and laying in position cast iron double flanged Tapers (all size in mm) Body x Branch.		Medium Class	Heavy Class
3.16.1	100x80	Each	816.00	890.00
3.16.2	125x80	Each	1334.00	1483.00
3.16.3	125x100	Each	1483.00	1631.00
3.16.4	150x80	Each	1557.00	1705.00
3.16.5	150x100	Each	1705.00	1853.00
3.16.6	150x125	Each	1853.00	2002.00
3.16.7	200x100	Each	2150.00	2298.00
3.16.8	200x125	Each	2298.00	2521.00
3.16.9	200x150	Each	2521.00	2743.00
3.16.10	250x125	Each	2817.00	3040.00
3.16.11	250x150	Each	2966.00	3262.00
3.16.12	250x200	Each	3410.00	3707.00
3.16.13	300x150	Each	3484.00	3781.00
3.16.14	300x200	Each	3929.00	4300.00
3.16.15	300x250	Each	4448.00	4819.00
3.16.16	350x200	Each	6126.00	6746.00
3.16.17	350x250	Each	6746.00	7444.00
3.16.18	350x300	Each	7444.00	8219.00
3.16.19	400x250	Each	7599.00	8452.00
3.16.20	400x300	Each	8374.00	9305.00
3.16.21	400x350	Each	9227.00	10235.00
3.16.22	450x300	Each	9072.00	10080.00
3.16.23	450x350	Each	10158.00	11243.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.16.24	450x400	Each	11088.00	12252.00
3.16.25	500x350	Each	11166.00	12407.00
3.16.26	500x400	Each	12174.00	13492.00
3.16.27	500x450	Each	13027.00	14423.00
3.16.28	600x400	Each	14733.00	16284.00
3.16.29	600x450	Each	15508.00	17214.00
3.16.30	600x500	Each	16749.00	18532.00
3.16.31	700x500	Each	19695.00	21789.00
3.16.32	700x600	Each	22254.00	24581.00
3.16.33	750x600	Each	23728.00	26209.00
3.16.34	750x700	Each	26674.00	29466.00
3.16.35	800x600	Each	25899.00	28535.00
3.16.36	800x700	Each	28845.00	31792.00
3.16.37	800x750	Each	30086.00	33188.00
3.16.38	900x700	Each	32180.00	35514.00
3.16.39	900x750	Each	33575.00	37065.00
3.16.40	900x800	Each	35747.00	39391.00
3.16.41	1000x800	Each	40166.00	44199.00
3.16.42	1000x900	Each	43423.00	47843.00
3.17	Providing and laying in position all flanged cast iron crosses.		Medium Class	Heavy Class
3.17.1	80mm diameter	Each	1939.00	2094.00
3.17.2	100mm diameter	Each	2404.00	2636.00
3.17.3	125mm diameter	Each	3179.00	3567.00
3.17.4	150mm diameter	Each	4187.00	4652.00
3.17.5	200mm diameter	Each	6513.00	7211.00
3.17.6	250mm diameter	Each	9460.00	10468.00
3.17.7	300mm diameter	Each	12794.00	13957.00
3.18	Providing and laying in position all flanged cast iron blank flanges.		Heavy Class	
3.18.1	80mm diameter	Each	362.00	
3.18.2	100mm diameter	Each	434.00	
3.18.3	125mm diameter	Each	579.00	
3.18.4	150mm diameter	Each	796.00	
3.18.5	200mm diameter	Each	1158.00	
3.18.6	250mm diameter	Each	1664.00	
3.18.7	300mm diameter	Each	2315.00	
3.18.8	350mm diameter	Each	3334.00	
3.18.9	400mm diameter	Each	4265.00	
3.18.10	450mm diameter	Each	5195.00	

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.18.11	500mm diameter	Each	6591.00	
3.18.12	600mm diameter	Each	9770.00	
3.18.13	700mm diameter	Each	13725.00	
3.18.14	750mm diameter	Each	16051.00	
3.18.15	800mm diameter	Each	18998.00	
3.18.16	900mm diameter	Each	24270.00	
3.18.17	1000mm diameter	Each	31482.00	
3.19	Labour for laying in position cast iron flanged sockets.		Medium Class	Heavy Class
3.19.1	80mm diameter	Each	26.00	28.00
3.19.2	100mm diameter	Each	32.00	34.00
3.19.3	125mm diameter	Each	41.00	43.00
3.19.4	150mm diameter	Each	54.00	56.00
3.19.5	200mm diameter	Each	78.00	80.00
3.19.6	250mm diameter	Each	125.00	134.00
3.19.7	300mm diameter	Each	159.00	170.00
3.19.8	350mm diameter	Each	203.00	215.00
3.19.9	400mm diameter	Each	250.00	265.00
3.19.10	450mm diameter	Each	289.00	306.00
3.19.11	500mm diameter	Each	351.00	373.00
3.19.12	600mm diameter	Each	476.00	504.00
3.19.13	700mm diameter	Each	623.00	659.00
3.19.14	750mm diameter	Each	707.00	748.00
3.20	Labour for laying in position cast iron flanged Spigot.		Medium Class	Heavy Class
3.20.1	80mm diameter	Each	24.00	26.00
3.20.2	100mm diameter	Each	28.00	30.00
3.20.3	125mm diameter	Each	37.00	41.00
3.20.4	150mm diameter	Each	45.00	50.00
3.20.5	200mm diameter	Each	75.00	84.00
3.20.6	250mm diameter	Each	101.00	114.00
3.20.7	300mm diameter	Each	129.00	147.00
3.20.8	350mm diameter	Each	164.00	183.00
3.20.9	400mm diameter	Each	198.00	224.00
3.20.10	450mm diameter	Each	235.00	265.00
3.20.11	500mm diameter	Each	280.00	315.00
3.20.12	600mm diameter	Each	433.00	489.00
3.20.13	700mm diameter	Each	562.00	636.00
3.20.14	750mm diameter	Each	638.00	720.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
3.21	Labour for laying in position cast iron double flanged 90° Bend.		Medium Class	Heavy Class
3.21.1	80mm diameter	Each	26.00	28.00
3.21.2	100mm diameter	Each	34.00	37.00
3.21.3	125mm diameter	Each	45.00	50.00
3.21.4	150mm diameter	Each	62.00	67.00
3.21.5	200mm diameter	Each	97.00	106.00
3.21.6	250mm diameter	Each	140.00	155.00
3.21.7	300mm diameter	Each	194.00	215.00
3.21.8	350mm diameter	Each	265.00	295.00
3.21.9	400mm diameter	Each	349.00	390.00
3.21.10	450mm diameter	Each	433.00	487.00
3.21.11	500mm diameter	Each	556.00	625.00
3.21.12	600mm diameter	Each	845.00	952.00
3.21.13	700mm diameter	Each	1220.00	1377.00
3.21.14	750mm diameter	Each	1439.00	1627.00
3.22	Labour for laying in position cast iron double flanged 45° bend .		Heavy Class	
3.22.1	80mm diameter	Each	30.00	
3.22.2	100mm diameter	Each	39.00	
3.22.3	125mm diameter	Each	54.00	
3.22.4	150mm diameter	Each	73.00	
3.22.5	200mm diameter	Each	116.00	
3.22.6	250mm diameter	Each	172.00	
3.22.7	300mm diameter	Each	241.00	
3.22.8	350mm diameter	Each	248.00	
3.22.9	400mm diameter	Each	321.00	
3.22.10	450mm diameter	Each	399.00	
3.22.11	500mm diameter	Each	498.00	
3.22.12	600mm diameter	Each	737.00	
3.22.13	700mm diameter	Each	1045.00	
3.22.14	750mm diameter	Each	1233.00	
3.23	Labour for laying in position cast iron double flanged 90° duck foot bend.		Medium Class	Heavy Class
3.23.1	80mm diameter	Each	43.00	45.00
3.23.2	100mm diameter	Each	54.00	56.00
3.23.3	125mm diameter	Each	73.00	78.00
3.23.4	150mm diameter	Each	97.00	101.00
3.23.5	200mm diameter	Each	151.00	159.00
3.23.6	250mm diameter	Each	224.00	239.00
3.23.7	300mm diameter	Each	315.00	336.00
3.23.8	350mm diameter	Each	431.00	461.00
3.23.9	400mm diameter	Each	565.00	605.00
3.23.10	450mm diameter	Each	700.00	754.00
3.23.11	500mm diameter	Each	892.00	961.00
3.23.12	600mm diameter	Each	1351.00	1459.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
3.24	Labour for laying in position cast iron all flanged tees (all sizes in mm).			
3.24.1	Body x Branch			
3.24.2	80x80	Each	43.00	45.00
3.24.3	100x80	Each	50.00	54.00
3.24.4	100x100	Each	52.00	56.00
3.24.5	125x80	Each	62.00	69.00
3.24.6	125x100	Each	69.00	73.00
3.24.7	125x125	Each	71.00	78.00
3.24.8	150x80	Each	82.00	88.00
3.24.9	150x100	Each	84.00	90.00
3.24.10	150x125	Each	88.00	97.00
3.24.11	150x150	Each	93.00	101.00
3.24.12	200x80	Each	121.00	134.00
3.24.13	200x100	Each	123.00	136.00
3.24.14	200x125	Each	129.00	142.00
3.24.15	200x150	Each	134.00	147.00
3.24.16	200x200	Each	144.00	159.00
3.24.17	250x80	Each	172.00	192.00
3.24.18	250x100	Each	175.00	194.00
3.24.19	250x125	Each	181.00	200.00
3.24.20	250x150	Each	187.00	207.00
3.24.21	250x200	Each	198.00	220.00
3.24.22	250x250	Each	213.00	235.00
3.24.23	300x80	Each	235.00	263.00
3.24.24	300x100	Each	239.00	267.00
3.24.25	300x125	Each	243.00	271.00
3.24.26	300x150	Each	250.00	278.00
3.24.27	300x200	Each	263.00	293.00
3.24.28	300x250	Each	278.00	308.00
3.24.29	300x300	Each	293.00	325.00
3.24.30	350x200	Each	328.00	364.00
3.24.31	350x250	Each	336.00	373.00
3.24.32	350x300	Each	366.00	405.00
3.24.33	350x350	Each	377.00	420.00
3.24.34	400x200	Each	407.00	454.70
3.24.35	400x250	Each	416.00	463.00
3.24.36	400x300	Each	448.00	500.00
3.24.37	400x350	Each	461.00	515.00
3.24.38	400x400	Each	476.00	530.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.24.39	450x250	Each	500.00	560.00
3.24.40	450x300	Each	532.00	597.00
3.24.41	450x350	Each	545.00	612.00
3.24.42	450x400	Each	558.00	625.00
3.24.43	450x450	Each	571.00	638.00
3.24.44	500x250	Each	605.00	679.00
3.24.45	500x300	Each	642.00	720.00
3.24.46	500x350	Each	657.00	737.00
3.24.47	500x400	Each	672.00	752.00
3.24.48	500x450	Each	685.00	767.00
3.24.49	500x500	Each	700.00	782.00
3.24.50	600x300	Each	892.00	1004.00
3.24.51	600x350	Each	914.00	1024.00
3.24.52	600x400	Each	931.00	1045.00
3.24.53	600x450	Each	944.00	1060.00
3.24.54	600x500	Each	959.00	1075.00
3.24.55	600x600	Each	993.00	1112.00
3.24.56	700x350	Each	1228.00	1383.00
3.24.57	700x400	Each	1245.00	1403.00
3.24.58	700x450	Each	1265.00	1422.00
3.24.59	700x500	Each	1282.00	1442.00
3.24.60	700x600	Each	1317.00	1478.00
3.24.61	700x700	Each	1362.00	1523.00
3.24.62	750x400	Each	1426.00	1607.00
3.24.63	750x450	Each	1444.00	1625.00
3.24.64	750x500	Each	1467.00	1651.00
3.24.65	750x600	Each	1495.00	1679.00
3.24.66	750x700	Each	1523.00	1707.00
3.24.67	750x750	Each	1551.00	1735.00
3.24.68	800x400	Each	1642.00	1849.00
3.24.69	800x450	Each	1659.00	1868.00
3.24.70	800x500	Each	1679.00	1890.00
3.24.71	800x600	Each	1719.00	1933.00
3.24.72	800x700	Each	1760.00	1974.00
3.24.73	800x750	Each	1784.00	2000.00
3.24.74	800x800	Each	1812.00	2028.00
3.24.75	900x450	Each	2081.00	2351.00
3.24.76	900x500	Each	2112.00	2383.00
3.24.77	900x600	Each	2155.00	2431.00
3.24.78	900x700	Each	2198.00	2476.00
3.24.79	900x750	Each	2224.00	2502.00
3.24.80	900x800	Each	2250.00	2528.00
3.24.81	900x900	Each	2286.00	2564.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
			Medium Class	Heavy Class
3.25	Labour for laying in position cast iron double flanged Tapers (all sizes in mm).		Medium Class	Heavy Class
3.25.1	Body x Branch			
3.25.2	100x80	Each	24.00	26.00
3.25.3	125x80	Each	39.00	43.00
3.25.4	125x100	Each	43.00	47.00
3.25.5	150x80	Each	45.00	50.00
3.25.6	150x100	Each	50.00	54.00
3.25.7	150x125	Each	54.00	58.00
3.25.8	200x100	Each	62.00	67.00
3.25.9	200x125	Each	67.00	73.00
3.25.10	200x150	Each	73.00	80.00
3.25.11	250x125	Each	82.00	88.00
3.25.12	250x150	Each	86.00	95.00
3.25.13	250x200	Each	99.00	108.00
3.25.14	300x150	Each	101.00	110.00
3.25.15	300x200	Each	114.00	125.00
3.25.16	300x250	Each	129.00	140.00
3.25.17	350x200	Each	170.00	187.00
3.25.18	350x250	Each	187.00	207.00
3.25.19	350x300	Each	207.00	228.00
3.25.20	400x250	Each	211.00	235.00
3.25.21	400x300	Each	233.00	259.00
3.25.22	400x350	Each	256.00	284.00
3.25.23	450x300	Each	252.00	280.00
3.25.24	450x350	Each	282.00	312.00
3.25.25	450x400	Each	308.00	340.00
3.25.26	500x350	Each	310.00	345.00
3.25.27	500x400	Each	338.00	375.00
3.25.28	500x450	Each	362.00	401.00
3.25.29	600x400	Each	409.00	452.00
3.25.30	600x450	Each	431.00	478.00
3.25.31	600x500	Each	465.00	515.00
3.25.32	700x500	Each	547.00	605.00
3.25.33	700x600	Each	618.00	683.00
3.25.34	750x600	Each	659.00	728.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
3.25.35	750x700	Each	741.00	819.00
3.25.36	800x600	Each	720.00	793.00
3.25.37	800x700	Each	802.00	883.00
3.25.38	800x750	Each	836.00	922.00
3.25.39	900x700	Each	894.00	987.00
3.25.40	900x750	Each	933.00	1030.00
3.25.41	900x800	Each	993.00	1095.00
3.25.42	1000x800	Each	1116.00	1228.00
3.25.43	1000x900	Each	1207.00	1329.00
3.26	Labour for laying in position all flanged cast iron crosses .		Medium Class	Heavy Class
3.26.1	80mm diameter	Each	54.00	58.00
3.26.2	100mm diameter	Each	67.00	73.00
3.26.3	125mm diameter	Each	88.00	99.00
3.26.4	150mm diameter	Each	116.00	129.00
3.26.5	200mm diameter	Each	181.00	200.00
3.26.6	250mm diameter	Each	263.00	291.00
3.26.7	300mm diameter	Each	356.00	388.00
3.27	Labour for laying in position cast iron blank flanges.		Heavy Class	
3.27.1	80mm diameter	Each	11.00	
3.27.2	100mm diameter	Each	13.00	
3.27.3	125mm diameter	Each	17.00	
3.27.4	150mm diameter	Each	24.00	
3.27.5	200mm diameter	Each	34.00	
3.27.6	250mm diameter	Each	50.00	
3.27.7	300mm diameter	Each	69.00	
3.27.8	350mm diameter	Each	93.00	
3.27.9	400mm diameter	Each	119.00	
3.27.10	450mm diameter	Each	144.00	
3.27.11	500mm diameter	Each	183.00	
3.27.12	600mm diameter	Each	271.00	
3.27.13	700mm diameter	Each	381.00	
3.27.14	750mm diameter	Each	446.00	
3.27.15	800mm diameter	Each	528.00	
3.27.16	900mm diameter	Each	674.00	
3.27.17	1000mm diameter	Each	875.00	
3.28	Providing and laying in position sizes of flanged cast iron standard specials class medium or heavy which does not appear in above items of the schedule.		Medium Class	Heavy Class
3.28.1	80mm to 300mm dia	Kg	73.00	73.00
3.28.2	Above 300mm Dia	Kg	76.00	76.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
3.29	Labour for laying in position sizes of flanged cast iron standard specials which does not appear in above items of the schedule.		
3.29.1	80mm to 750mm	Kg	2.00
3.30	Providing, laying & jointing CI dismantling joint as per standard specifications complete of the following sizes including all jointing material.		
3.30.1	80mm diameter	Each	2120.00
3.30.2	100mm diameter	Each	2350.00
3.30.3	125mm diameter	Each	2520.00
3.30.4	150mm diameter	Each	3750.00
3.30.5	200mm diameter	Each	5650.00
3.30.6	250mm diameter	Each	7900.00
3.30.7	300mm diameter	Each	10100.00
3.30.8	350mm diameter	Each	12200.00
3.30.9	400mm diameter	Each	15600.00
3.30.10	450mm diameter	Each	17300.00
3.30.11	500mm diameter	Each	21300.00
3.30.12	600mm diameter	Each	32000.00
3.30.13	700mm diameter	Each	47300.00

CHAPTER- 4
DUCTILE IRON PRESSURE PIPES AND SPECIALS WITH TYTON
JOINTS

- 1 (i) Centrifugally cast (spun) Ductile Iron pressure pipes shall conform to IS 8329-2000 (Reaffirmation year 2020) duly inspected and tested and having BIS certification mark.
(ii) The Cement Mortar lining in the DI pipe shall be as per IS - 11906:1986.(Reaffirmation year 2017)
- 2 Ductile Iron fittings for pressure pipes shall conform to IS 9523-2000 (Reaffirmation year 2020) duly inspected and tested and having BIS certification mark.
- 3 Rubber sealing rings shall conform to IS 5382-2000 duly inspected and tested and having BIS certification mark.
- 4 The laying of D.I. Pipe shall conform to IS - 12288 - 1987.(Reaffirmation year 2017)
- 5 Measurement
 - (a) All measurements should be of the finished work.
 - (b) D.I. Pipes are designated by Inner diameter.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 4- DUCTILE IRON PRESSURE PIPES AND SPECIALS WITH TYTON JOINTS

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.1	Providing, laying, jointing & testing of socket & spigot centrifugally cast (Spun) Ductile Iron pressure pipes with inside cement mortar lining (class K-7) with suitable Rubber Gasket (Push on) joints as per IS:5382/85 including testing of joint.		
4.1.1	80mm diameter	Meter	1035.00
4.1.2	100mm diameter	Meter	1074.00
4.1.3	150mm diameter	Meter	1573.00
4.1.4	200mm diameter	Meter	2007.00
4.1.5	250mm diameter	Meter	2628.00
4.1.6	300mm diameter	Meter	3319.00
4.1.7	350mm diameter	Meter	4147.00
4.1.8	400mm diameter	Meter	5173.00
4.1.9	450mm diameter	Meter	6022.00
4.1.10	500mm diameter	Meter	7030.00
4.1.11	600mm diameter	Meter	8918.00
4.1.12	700mm diameter	Meter	12944.00
4.1.13	750mm diameter	Meter	15122.00
4.1.14	800mm diameter	Meter	16865.00
4.1.15	900mm diameter	Meter	20436.00
4.1.16	1000mm diameter	Meter	24552.00
4.2	Labour for laying in position socket & spigot Ductile Iron(k-7) pressure pipes.		
4.2.1	80mm diameter	Meter	16.00
4.2.2	100mm diameter	Meter	19.00
4.2.3	150mm diameter	Meter	28.00
4.2.4	200mm diameter	Meter	37.00
4.2.5	250mm diameter	Meter	50.00
4.2.6	300mm diameter	Meter	61.00
4.2.7	350mm diameter	Meter	84.00
4.2.8	400mm diameter	Meter	100.00
4.2.9	450mm diameter	Meter	119.00
4.2.10	500mm diameter	Meter	136.00
4.2.11	600mm diameter	Meter	181.00
4.2.12	700mm diameter	Meter	237.00
4.2.13	750mm diameter	Meter	261.00
4.2.14	800mm diameter	Meter	298.00
4.2.15	900mm diameter	Meter	355.00
4.2.16	1000mm diameter	Meter	441.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.3	Providing, laying, jointing & testing of socket & spigot centrifugally cast (Spun) Ductile Iron pressure pipes with inside cement mortar lining (class K-9) with suitable Rubber Gasket (Push on) joints as per IS:5382/85 including testing of joint		
4.3.1	80mm diameter	Meter	1149.00
4.3.2	100mm diameter	Meter	1179.00
4.3.3	150mm diameter	Meter	1734.00
4.3.4	200mm diameter	Meter	2319.00
4.3.5	250mm diameter	Meter	3101.00
4.3.6	300mm diameter	Meter	3920.00
4.3.7	350mm diameter	Meter	5200.00
4.3.8	400mm diameter	Meter	5883.00
4.3.9	450mm diameter	Meter	7260.00
4.3.10	500mm diameter	Meter	8715.00
4.3.11	600mm diameter	Meter	11338.00
4.3.12	700mm diameter	Meter	14699.00
4.3.13	750mm diameter	Meter	16452.00
4.3.14	800mm diameter	Meter	18079.00
4.3.15	900mm diameter	Meter	22031.00
4.3.16	1000mm diameter	Meter	25951.00
4.4	Labour for laying in position socket & spigot Ductile Iron (k-9) pressure pipes.		
4.4.1	80mm diameter	Meter	19.00
4.4.2	100mm diameter	Meter	21.00
4.4.3	150mm diameter	Meter	32.00
4.4.4	200mm diameter	Meter	44.00
4.4.5	250mm diameter	Meter	60.00
4.4.6	300mm diameter	Meter	75.00
4.4.7	350mm diameter	Meter	100.00
4.4.8	400mm diameter	Meter	118.00
4.4.9	450mm diameter	Meter	140.00
4.4.10	500mm diameter	Meter	161.00
4.4.11	600mm diameter	Meter	215.00
4.4.12	700mm diameter	Meter	269.00
4.4.13	750mm diameter	Meter	297.00
4.4.14	800mm diameter	Meter	324.00
4.4.15	900mm diameter	Meter	398.00
4.4.16	1000mm diameter	Meter	477.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.5	Jointing DI pipes class K-7 and K-9 including testing of joints and cost of jointing materials (rubber ISI marked Gasket (push on) joint as per IS-5382/85 and soap solution etc.)		
4.5.1	80mm diameter	Each	123.00
4.5.2	100mm diameter	Each	118.00
4.5.3	125mm diameter	Each	142.00
4.5.3	150mm diameter	Each	174.00
4.5.4	200mm diameter	Each	227.00
4.5.5	250mm diameter	Each	301.00
4.5.6	300mm diameter	Each	351.00
4.5.7	350mm diameter	Each	395.00
4.5.8	400mm diameter	Each	471.00
4.5.9	450mm diameter	Each	560.00
4.5.10	500mm diameter	Each	647.00
4.5.11	600mm diameter	Each	797.00
4.5.12	700mm diameter	Each	1125.00
4.5.13	750mm diameter	Each	1281.00
4.5.14	800mm diameter	Each	1428.00
4.5.15	900mm diameter	Each	1559.00
4.5.16	1000mm diameter	Each	1947.00
4.6	Labour Charges for jointing D.I. Pipes class K7 & K9 including testing of joints but excluding cost of Rubber Gasket. (push on)		
4.6.1	80mm diameter	Each	84.00
4.6.2	100mm diameter	Each	63.00
4.6.3	125mm diameter	Each	98.00
4.6.4	150mm diameter	Each	98.00
4.6.5	200mm diameter	Each	126.00
4.6.6	250mm diameter	Each	155.00
4.6.7	300mm diameter	Each	183.00
4.6.8	350mm diameter	Each	197.00
4.6.9	400mm diameter	Each	218.00
4.6.10	450mm diameter	Each	239.00
4.6.11	500mm diameter	Each	267.00
4.6.12	600mm diameter	Each	281.00
4.6.13	700mm diameter	Each	309.00
4.6.14	750mm diameter	Each	337.00
4.6.15	800mm diameter	Each	351.00
4.6.16	900mm diameter	Each	365.00
4.6.17	1000mm diameter	Each	394.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.7	Providing and Laying ductile iron PN-16 type flanged sockets conforming to IS-9523/2000 having dimension as per table 23 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000.		
4.7.1	80mm	Each	660.00
4.7.2	100mm	Each	747.00
4.7.3	150mm	Each	1151.00
4.7.4	200mm	Each	1636.00
4.7.5	250mm	Each	2131.00
4.7.6	300mm	Each	2872.00
4.7.7	350mm	Each	4917.00
4.7.8	400mm	Each	6016.00
4.7.9	450mm	Each	7441.00
4.7.10	500mm	Each	9181.00
4.7.11	600mm	Each	14794.00
4.7.12	700mm	Each	22287.00
4.7.13	750mm	Each	25213.00
4.7.14	800mm	Each	29610.00
4.7.15	900mm	Each	36443.00
4.7.16	1000mm	Each	48498.00
4.8	Labour charges only for Laying Ductile Iron PN-16 type flanged sockets conforming to IS-9523/2000 having dimension as per table 23 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000.		
4.8.1	80mm	Each	32.00
4.8.2	100mm	Each	36.00
4.8.3	150mm	Each	47.00
4.8.4	200mm	Each	55.00
4.8.5	250mm	Each	79.00
4.8.6	300mm	Each	111.00
4.8.7	350mm	Each	150.00
4.8.8	400mm	Each	194.00
4.8.9	450mm	Each	245.00
4.8.10	500mm	Each	285.00
4.8.11	600mm	Each	356.00
4.8.12	700mm	Each	545.00
4.8.13	750mm	Each	672.00
4.8.14	800mm	Each	771.00
4.8.15	900mm	Each	870.00
4.8.16	1000mm	Each	1087.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
			PN 10	PN 16
4.9	Providing, Laying and testing ductile iron flanged spigot conforming to IS-9523/2000 having dimension as per table 24 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000.			
4.9.1	80mm	Each	660.00	957.00
4.9.2	100mm	Each	823.00	1187.00
4.9.3	150mm	Each	1311.00	1886.00
4.9.4	200mm	Each	1876.00	2700.00
4.9.5	250mm	Each	2612.00	4181.00
4.9.6	300mm	Each	3507.00	5355.00
4.9.7	350mm	Each	6084.00	8272.00
4.9.8	400mm	Each	7716.00	10136.00
4.9.9	450mm	Each	9562.00	12532.00
4.9.10	500mm	Each	11933.00	15827.00
4.9.11	600mm	Each	17209.00	22262.00
4.9.12	700mm	Each	26938.00	35699.00
4.9.13	750mm	Each	30570.00	41801.00
4.9.14	800mm	Each	34173.00	46490.00
4.9.15	900mm	Each	40844.00	60389.00
4.9.16	1000mm	Each	51140.00	74903.00
4.10	Labour only for Laying Ductile Iron PN-16 type flanged Spigot conforming to IS-9523/2000 having dimension as per table 24 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000.			
4.10.1	80mm	Each	32.00	
4.10.2	100mm	Each	36.00	
4.10.3	150mm	Each	47.00	
4.10.4	200mm	Each	55.00	
4.10.5	250mm	Each	79.00	
4.10.6	300mm	Each	103.00	
4.10.7	350mm	Each	134.00	
4.10.8	400mm	Each	174.00	
4.10.9	450mm	Each	213.00	
4.10.10	500mm	Each	237.00	
4.10.11	600mm	Each	285.00	
4.10.12	700mm	Each	415.00	
4.10.13	750mm	Each	585.00	
4.10.14	800mm	Each	712.00	
4.10.15	900mm	Each	771.00	
4.10.16	1000mm	Each	988.00	

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
			PN 10	PN 16
4.11	Providing & laying Ductile iron Mechanical joint collar with follower glands conforming to IS-9523/2000 having dimension as per table 24 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.			
4.11.1	80mm	Each	1272.00	1605.00
4.11.2	100mm	Each	1546.00	1927.00
4.11.3	150mm	Each	2597.00	3103.00
4.11.4	200mm	Each	3253.00	3954.00
4.11.5	250mm	Each	4927.00	5138.00
4.11.6	300mm	Each	5782.00	6739.00
4.11.7	350mm	Each	9922.00	10418.00
4.11.8	400mm	Each	12198.00	12797.00
4.11.9	450mm	Each	14024.00	14813.00
4.11.10	500mm	Each	16658.00	18975.00
4.11.11	600mm	Each	21076.00	23803.00
4.11.12	700mm	Each	39306.00	44332.00
4.11.13	750mm	Each	44042.00	49678.00
4.11.14	800mm	Each	50305.00	56745.00
4.11.15	900mm	Each	58809.00	66349.00
4.11.16	1000mm	Each	76112.00	85863.00
4.12	Labour only for Laying Ductile Iron Mechanical Joint collar with follower glands conforming to IS-9523/2000 having dimension as per table 24 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.			
4.12.1	80mm	Each	53.00	
4.12.2	100mm	Each	64.00	
4.12.3	150mm	Each	102.00	
4.12.4	200mm	Each	124.00	
4.12.5	250mm	Each	170.00	
4.12.6	300mm	Each	219.00	
4.12.7	350mm	Each	298.00	
4.12.8	400mm	Each	377.00	
4.12.9	450mm	Each	438.00	
4.12.10	500mm	Each	506.00	
4.12.11	600mm	Each	641.00	
4.12.12	700mm	Each	958.00	
4.12.13	750mm	Each	1094.00	
4.12.14	800mm	Each	1264.00	
4.12.15	900mm	Each	1517.00	
4.12.16	1000mm	Each	1935.00	

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.13	Providing & laying Ductile iron Dismantling joints.			
4.13.1	80mm	Each	2059.00	
4.13.2	100mm	Each	2446.00	
4.13.3	125 mm	Each	3469.00	
4.13.4	200 mm	Each	5178.00	
4.13.5	250mm	Each	7489.00	
4.13.6	300mm	Each	9198.00	
4.13.7	350mm	Each	12621.00	
4.13.8	400mm	Each	16046.00	
4.13.9	450mm	Each	18670.00	
4.13.10	500mm	Each	24694.00	
4.13.11	600mm	Each	35678.00	
4.14	Labour only for Laying Ductile iron Dismantling joints.			
4.14.1	80mm	Each	53.00	
4.14.2	100mm	Each	64.00	
4.14.3	125 mm	Each	85.00	
4.14.4	200 mm	Each	164.00	
4.14.5	250mm	Each	219.00	
4.14.6	300mm	Each	298.00	
4.14.7	350mm	Each	377.00	
4.14.8	400mm	Each	438.00	
4.14.9	450mm	Each	506.00	
4.14.10	500mm	Each	641.00	
4.14.11	600mm	Each	958.00	
4.15	Providing, Laying & Testing Ductile Iron Double Socket 90° Bends conforming to IS-9523/2000 having dimension as per table 15 of IS-9523/2000 in the following nominal diameter/sizes with external bitumen coating and internal cement mortar lining.		PN 10	PN 16
4.15.1	80mm	Each	682.00	803.00
4.15.2	100mm	Each	834.00	981.00
4.15.3	125mm	Each	1136.00	1338.00
4.15.4	150 mm	Each	1515.00	1784.00
4.15.5	200mm	Each	2425.00	2854.00
4.15.6	250mm	Each	3415.00	4109.00
4.15.7	300mm	Each	4932.00	5893.00
4.15.8	350mm	Each	9064.00	8569.00
4.15.9	400mm	Each	11697.00	11315.00
4.15.10	450mm	Each	15382.00	14759.00
4.15.11	500mm	Each	19068.00	19905.00
4.15.12	600mm	Each	29591.00	34758.00
4.15.13	700mm	Each	51702.00	58298.00
4.15.14	750mm	Each	59749.00	67387.00
4.15.15	800mm	Each	71742.00	80880.00
4.15.16	900mm	Each	94971.00	107072.00
4.15.17	1000mm	Each	125849.00	141903.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.16	Labour charges for Laying Ductile Iron Double Socket 90° Bends conforming to IS-9523/2000 having dimension as per table 15 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.			
4.16.1	80mm	Each	26.00	
4.16.2	100mm	Each	32.00	
4.16.3	125mm	Each	44.00	
4.16.4	150 mm	Each	59.00	
4.16.5	200mm	Each	94.00	
4.16.6	250mm	Each	141.00	
4.16.7	300mm	Each	200.00	
4.16.8	350mm	Each	265.00	
4.16.9	400mm	Each	339.00	
4.16.10	450mm	Each	442.00	
4.16.11	500mm	Each	545.00	
4.16.12	600mm	Each	827.00	
4.16.13	700mm	Each	1207.00	
4.16.14	750mm	Each	1457.00	
4.16.15	800mm	Each	1619.00	
4.16.16	900mm	Each	2164.00	
4.16.17	1000mm	Each	2944.00	
4.17	Providing & Laying Ductile Iron Double Socket 45° Bends conforming to IS-9523/2000 having dimension as per table 16 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.		PN 10	PN 16
4.17.1	80mm	Each	607.00	714.00
4.17.2	100mm	Each	758.00	892.00
4.17.3	125mm	Each	985.00	1160.00
4.17.4	150 mm	Each	1212.00	1427.00
4.17.5	200mm	Each	1974.00	2325.00
4.17.6	250mm	Each	2654.00	3125.00
4.17.7	300mm	Each	3715.00	4373.00
4.17.8	350mm	Each	6741.00	6396.00
4.17.9	400mm	Each	8434.00	8364.00
4.17.10	450mm	Each	11170.00	10442.00
4.17.11	500mm	Each	13493.00	14002.00
4.17.12	600mm	Each	20850.00	24491.00
4.17.13	700mm	Each	35667.00	40208.00
4.17.14	750mm	Each	40456.00	44515.00
4.17.15	800mm	Each	48653.00	53503.00
4.17.16	900mm	Each	63765.00	70133.00
4.17.17	1000mm	Each	84720.00	93167.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.18	Labour charges for Laying Ductile Iron Double Socket 45° Bends conforming to IS-9523/2000 having dimension as per table 16 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.			
4.18.1	80mm	Each	24.00	
4.18.2	100mm	Each	29.00	
4.18.3	125mm	Each	38.00	
4.18.4	150 mm	Each	47.00	
4.18.5	200mm	Each	82.00	
4.18.6	250mm	Each	106.00	
4.18.7	300mm	Each	147.00	
4.18.8	350mm	Each	191.00	
4.18.9	400mm	Each	250.00	
4.18.10	450mm	Each	324.00	
4.18.11	500mm	Each	397.00	
4.18.12	600mm	Each	583.00	
4.18.13	700mm	Each	795.00	
4.18.14	750mm	Each	1001.00	
4.18.15	800mm	Each	1089.00	
4.18.16	900mm	Each	1472.00	
4.18.17	1000mm	Each	1902.00	
4.19	Providing & Laying Ductile Iron Double Socket 22.5° Bends conforming to IS-9523/2000 having dimension as per table 17 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.		PN 10	PN 16
4.19.1	80mm	Each	531.00	624.00
4.19.2	100mm	Each	682.00	803.00
4.19.3	125mm	Each	910.00	1070.00
4.19.4	150 mm	Each	1136.00	1338.00
4.19.5	200mm	Each	1745.00	1968.00
4.19.6	250mm	Each	2277.00	2595.00
4.19.7	300mm	Each	3186.00	3752.00
4.19.8	350mm	Each	5583.00	5313.00
4.19.9	400mm	Each	6958.00	6697.00
4.19.10	450mm	Each	8953.00	8366.00
4.19.11	500mm	Each	10847.00	10978.00
4.19.12	600mm	Each	16639.00	19544.00
4.19.13	700mm	Each	27541.00	30033.00
4.19.14	750mm	Each	30729.00	33527.00
4.19.15	800mm	Each	37248.00	40619.00
4.19.16	900mm	Each	46835.00	51080.00
4.19.17	1000mm	Each	60366.00	65845.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.20	Labour charges for Laying Ductile Iron Double Socket 22.5° Bends conforming to IS-9523/2000 having dimension as per table 17 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.			
4.20.1	80mm	Each	21.00	
4.20.2	100mm	Each	26.00	
4.20.3	125mm	Each	35.00	
4.20.4	150 mm	Each	44.00	
4.20.5	200mm	Each	71.00	
4.20.6	250mm	Each	94.00	
4.20.7	300mm	Each	130.00	
4.20.8	350mm	Each	159.00	
4.20.9	400mm	Each	206.00	
4.20.10	450mm	Each	253.00	
4.20.11	500mm	Each	303.00	
4.20.12	600mm	Each	465.00	
4.20.13	700mm	Each	618.00	
4.20.14	750mm	Each	751.00	
4.20.15	800mm	Each	839.00	
4.20.16	900mm	Each	1075.00	
4.20.17	1000mm	Each	1413.00	
4.21	Providing & Laying Ductile Iron Double Socket 11.25° bends conforming to IS-9523/2000 having dimension as per table 18 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.		PN 10	PN 16
4.21.1	80mm	Each	531.00	624.00
4.21.2	100mm	Each	682.00	803.00
4.21.3	125mm	Each	834.00	981.00
4.21.4	150 mm	Each	1060.00	1249.00
4.21.5	200mm	Each	1591.00	1873.00
4.21.6	250mm	Each	2125.00	2503.00
4.21.7	300mm	Each	2884.00	3395.00
4.21.8	350mm	Each	4950.00	4625.00
4.21.9	400mm	Each	6108.00	5707.00
4.21.10	450mm	Each	7805.00	7490.00
4.21.11	500mm	Each	9270.00	9683.00
4.21.12	600mm	Each	14107.00	16328.00
4.21.13	700mm	Each	22686.00	24947.00
4.21.14	750mm	Each	25086.00	27602.00
4.21.15	800mm	Each	30947.00	34030.00
4.21.16	900mm	Each	38698.00	42560.00
4.21.17	1000mm	Each	50611.00	55652.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.22	Labour charges for Laying Ductile Iron Double Socket 11.25° bends conforming to IS-9523/2000 having dimension as per table 18 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining.			
4.22.1	80mm	Each	21.00	
4.22.2	100mm	Each	26.00	
4.22.3	125mm	Each	32.00	
4.22.4	150 mm	Each	41.00	
4.22.5	200mm	Each	62.00	
4.22.6	250mm	Each	88.00	
4.22.7	300mm	Each	118.00	
4.22.8	350mm	Each	138.00	
4.22.9	400mm	Each	171.00	
4.22.10	450mm	Each	236.00	
4.22.11	500mm	Each	265.00	
4.22.12	600mm	Each	389.00	
4.22.13	700mm	Each	506.00	
4.22.14	750mm	Each	618.00	
4.22.15	800mm	Each	689.00	
4.22.16	900mm	Each	883.00	
4.22.17	1000mm	Each	1119.00	
4.23	Providing & Laying Ductile Iron All socket Tees conforming to IS-9523/2000 having dimension as per table 21 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000. (All sizes in mm)		PN 10	PN 16
4.23.1	80x80	Each	911.00	1071.00
4.23.2	100x80	Each	1061.00	1250.00
4.23.3	100x100	Each	1137.00	1339.00
4.23.4	150x80	Each	1517.00	1786.00
4.23.5	150x100	Each	1594.00	1964.00
4.23.6	150x150	Each	1898.00	2322.00
4.23.7	200x80	Each	2125.00	2589.00
4.23.8	200x100	Each	2277.00	2768.00
4.23.9	200x150	Each	2583.00	3214.00
4.23.10	200x200	Each	3037.00	3576.00
4.23.11	250x80	Each	2658.00	3304.00
4.23.12	250x100	Each	2812.00	3572.00
4.23.13	250x150	Each	3191.00	4018.00
4.23.14	250x250	Each	4175.00	5090.00
4.23.15	300x100	Each	3794.00	4554.00
4.23.16	300x200	Each	4722.00	5739.00
4.23.17	300x300	Each	5850.00	6977.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.24	Labour charges for Laying Ductile Iron All socket Tees conforming to IS-9523/2000 having dimension as per table 21 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining. (All sizes in mm)			
4.24.1	80x80	Each	36.00	
4.24.2	100x80	Each	43.00	
4.24.3	100x100	Each	46.00	
4.24.4	150x80	Each	61.00	
4.24.5	150x100	Each	67.00	
4.24.6	150x150	Each	79.00	
4.24.7	200x80	Each	88.00	
4.24.8	200x100	Each	94.00	
4.24.9	200x150	Each	109.00	
4.24.10	200x200	Each	126.00	
4.24.11	250x80	Each	112.00	
4.24.12	250x100	Each	122.00	
4.24.13	250x150	Each	137.00	
4.24.14	250x250	Each	173.00	
4.24.15	300x100	Each	155.00	
4.24.16	300x200	Each	219.00	
4.24.17	300x300	Each	249.00	
4.25	Providing & Laying Ductile Iron Double Socket branch flange Tee conforming to IS-9523/2000 having dimension as per table 21 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000. (All sizes in mm)		PN 10	PN 16
4.25.1	80x80	Each	1066.00	1235.00
4.25.2	100x80	Each	1229.00	1425.00
4.25.3	100x100	Each	1314.00	1523.00
4.25.4	150x80	Each	1722.00	1996.00
4.25.5	150x100	Each	1695.00	2094.00
4.25.6	150x150	Each	2216.00	2569.00
4.25.7	200x80	Each	2378.00	2756.00
4.25.8	200x100	Each	2543.00	2949.00
4.25.9	200x150	Each	2953.00	3424.00
4.25.10	200x200	Each	3448.00	3997.00
4.25.11	250x80	Each	2953.00	3516.00
4.25.12	250x100	Each	3117.00	3614.00
4.25.13	250x150	Each	3618.00	4380.00
4.25.14	250x200	Each	4187.00	4947.00
4.25.15	250x250	Each	4843.00	5708.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.25.16	300x80	Each	3935.00	4561.00
4.25.17	300x100	Each	4101.00	4754.00
4.25.18	300x150	Each	4675.00	5420.00
4.25.19	300x200	Each	5253.00	6183.00
4.25.20	300x250	Each	5991.00	7015.00
4.25.21	300x300	Each	6816.00	7629.00
4.25.22	350x100	Each	6543.00	6152.00
4.25.23	350x200	Each	8293.00	7927.00
4.25.24	350x350	Each	11796.00	11891.00
4.25.25	400x80	Each	7419.00	7296.00
4.25.26	400x100	Each	7749.00	7612.00
4.25.27	400x150	Each	8737.00	8356.00
4.25.28	400x200	Each	9716.00	9595.00
4.25.29	400x300	Each	12008.00	11888.00
4.25.30	400x400	Each	15180.00	15128.00
4.25.31	450x100	Each	9599.00	9175.00
4.25.32	450x250	Each	13090.00	12513.00
4.25.33	500x100	Each	11234.00	11686.00
4.25.34	500x200	Each	13637.00	14298.00
4.25.35	500x400	Each	19963.00	22534.00
4.25.36	500x500	Each	24433.00	24202.00
4.25.37	600x200	Each	18652.00	22155.00
4.26	Labour charges for Laying Ductile Iron Double Socketed Branch Flange Tee Conforming to IS-9523/2000 having dimension as per table 21 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining. (All sizes in mm)			
4.26.1	80x80	Each	39.00	
4.26.2	100x80	Each	45.00	
4.26.3	100x100	Each	51.00	
4.26.4	150x80	Each	64.00	
4.26.5	150x100	Each	70.00	
4.26.6	150x150	Each	85.00	
4.26.7	200x80	Each	88.00	
4.26.8	200x100	Each	97.00	
4.26.9	200x150	Each	112.00	
4.26.10	200x200	Each	133.00	

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.26.11	250x80	Each	112.00	
4.26.12	250x100	Each	118.00	
4.26.13	250x150	Each	148.00	
4.26.14	250x200	Each	163.00	
4.26.15	250x250	Each	188.00	
4.26.16	300x80	Each	145.00	
4.26.17	300x100	Each	154.00	
4.26.18	300x150	Each	176.00	
4.26.19	300x200	Each	203.00	
4.26.20	300x250	Each	230.00	
4.26.21	300x300	Each	269.00	
4.26.22	350x100	Each	182.00	
4.26.23	350x200	Each	236.00	
4.26.24	350x350	Each	354.00	
4.26.25	400x80	Each	212.00	
4.26.26	400x100	Each	224.00	
4.26.27	400x150	Each	260.00	
4.26.28	400x200	Each	285.00	
4.26.29	400x300	Each	351.00	
4.26.30	400x400	Each	454.00	
4.26.31	450x100	Each	269.00	
4.26.32	450x250	Each	369.00	
4.26.33	500x100	Each	315.00	
4.26.34	500x200	Each	388.00	
4.26.35	500x400	Each	563.00	
4.26.36	500x500	Each	687.00	
4.26.37	600x200	Each	524.00	
4.27	Providing & Laying Ductile Iron Double Socket Reducer conforming to IS-9523/2000 having dimension as per table 21 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000. (All sizes in mm)		PN 10	PN 16
4.27.1	100x80	Each	608.00	715.00
4.27.2	150x80	Each	988.00	1163.00
4.27.3	150x100	Each	989.00	1252.00
4.27.4	200x100	Each	1518.00	1789.00
4.27.5	200x150	Each	1523.00	1967.00
4.27.6	250x150	Each	2130.00	2683.00
4.27.7	300x150	Each	2888.00	3488.00
4.27.8	300x200	Each	2888.00	3488.00
4.27.9	300x250	Each	2660.00	3220.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
4.27.10	350x200	Each	5277.00	5129.00
4.27.11	350x250	Each	5069.00	5030.00
4.27.12	350x300	Each	4756.00	4932.00
4.27.13	400x250	Each	6539.00	6115.00
4.27.14	400x300	Each	6328.00	5918.00
4.27.15	400x350	Each	5798.00	5326.00
4.27.16	450x350	Each	7800.00	7101.00
4.27.17	450x400	Each	7275.00	6707.00
4.27.18	500x350	Each	9812.00	10244.00
4.27.19	500x400	Each	9182.00	9705.00
4.27.20	600x400	Each	14203.00	17350.00
4.27.21	600x500	Each	12915.00	15367.00
4.28	Labour charges for Laying ductile iron double socket reducer conforming to IS-9523/2000 having dimension as per table 20 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000. (All sizes in mm)			
4.28.1	100x80	Each	25.00	
4.28.2	150x80	Each	41.00	
4.28.3	150x100	Each	45.00	
4.28.4	200x100	Each	64.00	
4.28.5	200x150	Each	70.00	
4.28.6	250x150	Each	95.00	
4.28.7	300x150	Each	124.00	
4.28.8	300x200	Each	124.00	
4.28.9	300x250	Each	115.00	
4.28.10	350x200	Each	165.00	
4.28.11	350x250	Each	162.00	
4.28.12	350x300	Each	159.00	
4.28.13	400x250	Each	197.00	
4.28.14	400x300	Each	191.00	
4.28.15	400x350	Each	172.00	
4.28.16	450x350	Each	229.00	
4.28.17	450x400	Each	216.00	
4.28.18	500x350	Each	302.00	
4.28.19	500x400	Each	286.00	
4.28.20	600x400	Each	445.00	
4.28.21	600x500	Each	394.00	

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
			PN 10	PN 16
4.29	Providing and Laying ductile iron PN-10 type flanged sockets conforming to IS-9523/2000 having dimension as per table 23 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000.			
4.29.1	80mm	Each	594.00	763.00
4.29.2	100mm	Each	671.00	859.00
4.29.3	150mm	Each	1039.00	1336.00
4.29.4	200mm	Each	1485.00	1908.00
4.29.5	250mm	Each	1930.00	2481.00
4.29.6	300mm	Each	2597.00	3244.00
4.29.7	350mm	Each	4435.00	4603.00
4.29.8	400mm	Each	5421.00	5649.00
4.29.9	450mm	Each	6686.00	6276.00
4.29.10	500mm	Each	8255.00	8194.00
4.29.11	600mm	Each	13340.00	13640.00
4.29.12	700mm	Each	20146.00	23125.00
4.29.13	750mm	Each	22819.00	26215.00
4.29.14	800mm	Each	26726.00	30673.00
4.29.15	900mm	Each	32963.00	37840.00
4.29.16	1000mm	Each	43879.00	50359.00
4.30	Labour only for Laying Ductile Iron PN-10 type flanged sockets conforming to IS-9523/2000 having dimension as per table 23 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000.			
4.30.1	80mm	Each	27.00	
4.30.2	100mm	Each	31.00	
4.30.3	150mm	Each	48.00	
4.30.4	200mm	Each	68.00	
4.30.5	250mm	Each	89.00	
4.30.6	300mm	Each	116.00	
4.30.7	350mm	Each	150.00	
4.30.8	400mm	Each	184.00	
4.30.9	450mm	Each	204.00	
4.30.10	500mm	Each	245.00	
4.30.11	600mm	Each	358.00	
4.30.12	700mm	Each	623.00	
4.30.13	750mm	Each	797.00	
4.30.14	800mm	Each	811.00	
4.30.15	900mm	Each	1032.00	
4.30.16	1000mm	Each	1328.00	

S. No.	Particulars of Items	Unit	Rate (in Rs.)	
			PN 10	PN 16
4.31	Providing and Laying ductile type iron flanged spigot conforming to IS-9523/2000 having dimension as per table 24 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000.			
4.31.1	80mm	Each	595.00	765.00
4.31.2	100mm	Each	744.00	957.00
4.31.3	150mm	Each	1191.00	1531.00
4.31.4	200mm	Each	1712.00	2200.00
4.31.5	250mm	Each	2381.00	3061.00
4.31.6	300mm	Each	3195.00	3923.00
4.31.7	350mm	Each	5524.00	5558.00
4.31.8	400mm	Each	6998.00	6817.00
4.31.9	450mm	Each	8672.00	8390.00
4.31.10	500mm	Each	10831.00	10951.00
4.31.11	600mm	Each	15649.00	17703.00
4.31.12	700mm	Each	24584.00	28251.00
4.31.13	750mm	Each	27815.00	31958.00
4.31.14	800mm	Each	31018.00	35624.00
4.31.15	900mm	Each	37187.00	42731.00
4.31.16	1000mm	Each	46512.00	53435.00
4.32	Labour only for Laying Ductile Iron PN-10 / PN-16 type flanged Spigot conforming to IS-9523/2000 having dimension as per table 24 of IS-9523/2000 in the nominal diameter/sizes with external bitumen coating and internal cement mortar lining with finishing as per clause 13 of IS-9523/2000.			
4.32.1	80mm	Each		29.00
4.32.2	100mm	Each		37.00
4.32.3	150mm	Each		59.00
4.32.4	200mm	Each		84.00
4.32.5	250mm	Each		117.00
4.32.6	300mm	Each		151.00
4.32.7	350mm	Each		195.00
4.32.8	400mm	Each		239.00
4.32.9	450mm	Each		294.00
4.32.10	500mm	Each		352.00
4.32.11	600mm	Each		499.00
4.32.12	700mm	Each		888.00
4.32.13	750mm	Each		984.00
4.32.14	800mm	Each		1039.00
4.32.15	900mm	Each		1340.00
4.32.16	1000mm	Each		1626.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.33	Providing, Laying & Jointing (i/c all jointing material) & testing of welded/Socketed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 1m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.33.1	100mm	Each	6763.00
4.33.2	150mm	Each	9106.00
4.33.3	200mm	Each	12871.00
4.33.4	250mm	Each	16194.00
4.33.5	300mm	Each	20725.00
4.33.6	350mm	Each	29624.00
4.33.7	400mm	Each	37019.00
4.33.8	450mm	Each	46324.00
4.33.9	500mm	Each	51998.00
4.33.10	600mm	Each	70486.00
4.33.11	700mm	Each	87519.00
4.34	Providing, Laying & Jointing (i/c all jointing material) & testing of welded/Socketed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 2m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.34.1	100mm	Each	8658.00
4.34.2	150mm	Each	11883.00
4.34.3	200mm	Each	16692.00
4.34.4	250mm	Each	21324.00
4.34.5	300mm	Each	27204.00
4.34.6	350mm	Each	37640.00
4.34.7	400mm	Each	46579.00
4.34.8	450mm	Each	57643.00
4.34.9	500mm	Each	65188.00
4.34.10	600mm	Each	87798.00
4.34.11	700mm	Each	109387.00
4.35	Providing, Laying & Jointing (i/c all jointing material) & testing of welded/Socketed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 3m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.35.1	100mm	Each	10618.00
4.35.2	150mm	Each	14747.00
4.35.3	200mm	Each	20632.00
4.35.4	250mm	Each	26601.00
4.35.5	300mm	Each	33873.00
4.35.6	350mm	Each	45933.00
4.35.7	400mm	Each	56484.00
4.35.8	450mm	Each	69393.00
4.35.9	500mm	Each	78861.00
4.35.10	600mm	Each	105763.00
4.35.11	700mm	Each	132307.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.36	Providing, Laying & Jointing (i/c all jointing material) & testing of welded/Socketed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 4m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.36.1	100mm	Each	12576.00
4.36.2	150mm	Each	17610.00
4.36.3	200mm	Each	24571.00
4.36.4	250mm	Each	31879.00
4.36.5	300mm	Each	40543.00
4.36.6	350mm	Each	54224.00
4.36.7	400mm	Each	66388.00
4.36.8	450mm	Each	81142.00
4.36.9	500mm	Each	92534.00
4.36.10	600mm	Each	123728.00
4.36.11	700mm	Each	155105.00
4.37	Providing, Laying & Jointing (i/c all jointing material) & testing of welded/Socketed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 4.5m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.37.1	100mm	Each	13555.00
4.37.2	150mm	Each	19041.00
4.37.3	200mm	Each	26540.00
4.37.4	250mm	Each	34517.00
4.37.5	300mm	Each	43876.00
4.37.6	350mm	Each	58370.00
4.37.7	400mm	Each	71339.00
4.37.8	450mm	Each	87018.00
4.37.9	500mm	Each	99369.00
4.37.10	600mm	Each	132712.00
4.37.11	700mm	Each	166507.00
4.38	Providing, Laying & ,Jointing (i/c all jointing material) & testing of welded/Socketed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 5 m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.38.1	100mm	Each	14536.00
4.38.2	150mm	Each	20477.00
4.38.3	200mm	Each	28516.00
4.38.4	250mm	Each	37172.00
4.38.5	300mm	Each	47231.00
4.38.6	350mm	Each	62567.00
4.38.7	400mm	Each	76366.00
4.38.8	450mm	Each	92994.00
4.38.9	500mm	Each	106354.00
4.38.10	600mm	Each	141921.00
4.38.11	700mm	Each	178131.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.39	Providing, Laying & ,Jointing (i/c all jointing material) & testing of welded/Socketed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 5.2/5.5 m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.39.1	100mm	Each	14927.00
4.39.2	150mm	Each	21049.00
4.39.3	200mm	Each	29303.00
4.39.4	250mm	Each	38226.00
4.39.5	300mm	Each	48565.00
4.39.6	350mm	Each	64226.00
4.39.7	400mm	Each	78344.00
4.39.8	450mm	Each	95342.00
4.39.9	500mm	Each	109088.00
4.39.10	600mm	Each	145513.00
4.39.11	700mm	Each	182691.00
4.40	Labour only for Laying welded/screwed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 1m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.40.1	100mm	Each	85.00
4.40.2	150mm	Each	128.00
4.40.3	200mm	Each	173.00
4.40.4	250mm	Each	233.00
4.40.5	300mm	Each	299.00
4.40.6	350mm	Each	358.00
4.40.7	400mm	Each	423.00
4.40.8	450mm	Each	500.00
4.40.9	500mm	Each	579.00
4.40.10	600mm	Each	779.00
4.40.11	700mm	Each	998.00
4.41	Labour only for Laying welded/Screwed double flanged centrifugal cast (spun) ductile Iron pressure pipes confirming to IS: 8329/2000 in the length of 2m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.41.1	100mm	Each	140.00
4.41.2	150mm	Each	210.00
4.41.3	200mm	Each	285.00
4.41.4	250mm	Each	371.00
4.41.5	300mm	Each	473.00
4.41.6	350mm	Each	530.00
4.41.7	400mm	Each	613.00
4.41.8	450mm	Each	702.00
4.41.9	500mm	Each	769.00
4.41.10	600mm	Each	980.00
4.41.11	700mm	Each	1346.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.42	Labour only for Laying welded/Screwed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS: 8329/2000 in the length of 3m. for class K-9 with inside cement mortar, lining for the sizes/dia pipes.		
4.42.1	100mm	Each	195.00
4.42.2	150mm	Each	292.00
4.42.3	200mm	Each	397.00
4.42.4	250mm	Each	510.00
4.42.5	300mm	Each	647.00
4.42.6	350mm	Each	702.00
4.42.7	400mm	Each	803.00
4.42.8	450mm	Each	904.00
4.42.9	500mm	Each	959.00
4.42.10	600mm	Each	1182.00
4.42.11	700mm	Each	1694.00
4.43	Labour only for Laying welded/Screwed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS: 8329/2000 in the length of 4m. for class K-9 with inside cement mortar, lining for the sizes/dia pipes.		
4.43.1	100mm	Each	251.00
4.43.2	150mm	Each	374.00
4.43.3	200mm	Each	509.00
4.43.4	250mm	Each	648.00
4.43.5	300mm	Each	820.00
4.43.6	350mm	Each	875.00
4.43.7	400mm	Each	993.00
4.43.8	450mm	Each	1106.00
4.43.9	500mm	Each	1149.00
4.43.10	600mm	Each	1383.00
4.43.11	700mm	Each	2042.00
4.44	Labour only for Laying and Jointing welded/Screwed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS: 8329/2000 in the length of 4.5m. for class K-9 with inside cement mortar, lining for the sizes/dia pipe.		
4.44.1	100mm	Each	278.00
4.44.2	150mm	Each	415.00
4.44.3	200mm	Each	565.00
4.44.4	250mm	Each	718.00
4.44.5	300mm	Each	907.00
4.44.6	350mm	Each	961.00
4.44.7	400mm	Each	1088.00
4.44.8	450mm	Each	1207.00
4.44.9	500mm	Each	1243.00
4.44.10	600mm	Each	1484.00
4.44.11	700mm	Each	2216.00

S. No.	Particulars of Items	Unit	Rate (in Rs.)
4.45	Labour only for Laying welded/Screwed double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS: 8329/2000 in the length of 5m. for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.45.1	100mm	Each	325.00
4.45.2	150mm	Each	478.00
4.45.3	200mm	Each	658.00
4.45.4	250mm	Each	893.00
4.45.5	300mm	Each	1135.00
4.45.6	350mm	Each	1437.00
4.45.7	400mm	Each	1730.00
4.45.8	450mm	Each	2079.00
4.45.9	500mm	Each	2458.00
4.45.10	600mm	Each	3296.00
4.45.11	700mm	Each	4102.00
4.46	Labour only for Laying welded double flanged centrifugal cast (spun) ductile Iron pressure pipes conforming to IS:8329/2000 in the length of 5.2m for class K-9 with inside cement mortar lining for the sizes/dia pipes.		
4.46.1	100mm	Each	336.00
4.46.2	150mm	Each	494.00
4.46.3	200mm	Each	680.00
4.46.4	250mm	Each	920.00
4.46.5	300mm	Each	1170.00
4.46.6	350mm	Each	1471.00
4.46.7	400mm	Each	1768.00
4.46.8	450mm	Each	2119.00
4.46.9	500mm	Each	2496.00
4.46.10	600mm	Each	3336.00
4.46.11	700mm	Each	4172.00

CHAPTER- 5
UNPLASTICIZED PVC PIPES, PVC-O PIPES & FITTINGS FOR
POTABLE WATER SUPPLY

A PVC Pipes

- 1 Unplasticized PVC pipes for potable water supply as per IS 4985-2000(Reaffirmation year 2020) duly inspected and tested and having BIS certification mark.
- 2 Selection, Handling, storage and installation of UPVC Pipes as per IS 7634 (Part-3) - 2003(Reaffirmation year 2018)
- 3 Specification of Injection Moulded PVC socket fittings with solvent cement joints shall be as per IS 7834 (Part-I to VIII) - 1987.(Reaffirmation year 2018)
- 4 Visual Appearance
 - (i) The colour of the pipes shall be light grey. Slight variations in the appearance of the colour are permitted.
 - (ii) The internal and external surfaces of the pipe shall be smooth, clean and free from grooving and other defects. Slight shallow longitudinal grooves or irregularities in the pipe shall be permissible provided the wall thickness remains within the permissible limits.
 - (iii) Each pipe may also be marked with the standard mark of BIS certification.
- 5 Storage
 - (i) PVC solvent cement should be stored in a cool place except when actually in use at the site. The solvent cement has a limited self life when not stored in hermetically sealed containers.
 - (ii) Pipes should be stacked on a surface flat and free from sharp objects, stones or projection in order to avoid deformation or damage. Ends of pipes should be protected from abrasion and chipping.
- 6 In rocky area 15 cm. cushion of sand or moorum below and above the pipes should be provided as per IS 7634 (Part III) : 2003. (See Drawing No.-3)
- 7 Marking

Each pipe shall be clearly and indelibly marked in ink/paint or hot embossed on white base at intervals of not more than 3 meters, in colour as indicated below.

 - (a) Manufacturer's name or trade-mark
 - (b) Out side diameter,
 - (c) Class of pipe and pressure rating
 - (d) Batch or lot number
 - (e) The word plumbing in the case of plumbing pipes.
 - (f) Each pipe may also be marked with the standard mark BIS certification.

Class of Pipe	Colour
Class 3	Green
Class 4	Brown
Class 5	Yellow

- 8 Marking of fittings
 - (i) All fittings shall be clearly and indelibly marked at a prominent place visible even after the installation of the fittings with the following :
 - (a) Manufacturer's identification mark, and
 - (b) Size of the fitting and the appropriate class (working pressure) of IS : 4985-2000 (Reaffirmation year 2020) to which the pressure rating of the fitting corresponds.
 - (ii) PVC fittings also conforming to specific requirements as prescribed in the relevant parts of the standard may also be marked with the standard Mark.
 - 9 The work shall be executed in accordance with the specifications in of work and all relevant latest IS codes.
 - 10 Laying of pipes and fittings/specials includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.
 - 11 Measurement
 - (a) All measurement should be of the finished work only. The net length of pipes as laid or fixed shall be measured in running meters correct to 10mm. Specials shall be excluded and measured and paid separately under the relevant item. The portion of the pipe inside the joints shall not be included in the length of pipe work. Excavation, refilling, masonry and concrete work wherever required shall be measured and paid for separately under relevant items of work.
 - (b) UPVC Pipes are designated by Outer diameter.
 - 12 Rates
 - (i) The rate include the charges for all tools and plants and other appliances required for lifting, laying and jointing of pipes, specials and fittings in position as per approved drawings.
 - (ii) The rate includes provision for use of all coverings etc. to protect the works and inclement weather etc. and damages from fall of materials and other causes.
 - (iii) The rate includes provision of handling, storing as required and returning of empty bags or containers to the local body /departmental stores, without any extra cost for such materials as may be supplied by the department.
- B Oriented PVC (PVC-0) Pipes**
- 1 The Oriented Un-plasticized Polyvinyl Chloride PVC-O pipes for potable water supply as per IS: 16647-2017 duly inspected and tested and having BIS certification mark.
 - 2 Classification of the material to be used for manufacturing of PVC-O pipe shall be 500 and design coefficient (C- Factor) shall be 1.4.
 - 3 Selection, Handling, storage and installation of PVC-O pipes as per IS: 7634-2003 (Part-3)

- 4 Pipes should be stacked on a surface flat and free from sharp objects, stones or projection in order to avoid deformation or damages. Ends of pipes should be protected from abrasion and chipping
- 5 This pipe shall be used in water supply and sewerage works. These pipes are also used as rising mains (pumping mains).
- 6 In rocky areas 15 cm. cushion of sand or moorum below and above the pipes should be provided as per IS: 7634-2003 (Part III)
- 7 All measurements shall be of the finished work. The net length of pipes as laid or fixed shall be measured in running meters correct to 10 mm. Specials shall be excluded and measured and paid separately under the relevant item. The portion of the pipe inside the joints shall not be included in the length of pipe work. Excavation, refilling, masonry and concrete work wherever required shall be measured and paid for separately under relevant items of work.
- 8 Work shall be executed in accordance with the Indian Standards Specifications and special notes if any, mentioned in the agreement of the work
- 9 Ordinary HDPE/DI/CI fittings of relevant class shall be used for connecting and laying the PVC -O Pipe line. The rates for such works will be payable as per relevant chapters in SOR.
- 10 These pipes are to be used in water supply and to be installed below the ground where high vacuum or external pressure could be developed. As per Table 12 of BIS 16647:2017, the ring stiffness of the pipe shall be ≥ 4 KN/m² to meet the requirement of vacuum and external pressure. This criteria of ring stiffness can be met out from the class 500 PN 16 onwards rating pipes, hence the pipes of rating starting from PN 16 have been taken in this ISSR.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

**CHAPTER 5 - UNPLASTICIZED PVC PIPES, PVC-O PIPES & FITTINGS
FOR POTABLE WATER SUPPLY**

S.No.	Particulars of Items	Unit	Rates (in Rs.)		
5.1	Providing, laying, jointing & testing of following P.V.C. pipes with solvent cement joint for 6, 8 and 10 kg/ sq. cm. pressures including testing of joints, cost of jointing materials etc. complete in all respect.		6Kg/Cm ²	8 Kg/Cm ²	10Kg/Cm ²
5.1.1	90 mm dia.	RM.	139.00	168.00	206.00
5.1.2	110 mm dia.	RM.	195.00	248.00	306.00
5.1.3	140 mm dia.	RM.	315.00	406.00	486.00
5.1.4	160 mm dia.	RM.	507.00	528.00	636.00
5.1.5	180 mm dia.	RM.	515.00	660.00	800.00
5.1.6	200 mm dia.	RM.	635.00	815.00	987.00
5.1.7	250 mm dia	RM.	1227.00	1557.00	1928.00
5.1.8	315 mm dia	RM.	1868.00	2444.00	3045.00
5.2	Labour for laying in position & testing of following PVC pipes of 6, 8 and 10Kg/Sqcm. pressure.		6Kg/Cm ²	8 Kg/Cm ²	10Kg/Cm ²
5.2.1	90 mm dia.	RM.	7.00	7.00	7.00
5.2.2	110 mm dia.	RM.	7.00	7.00	7.00
5.2.3	140 mm dia.	RM.	7.00	7.00	7.00
5.2.4	160 mm dia.	RM.	10.00	10.00	10.00
5.2.5	180 mm dia.	RM.	10.00	10.00	10.00
5.2.6	200 mm dia.	RM.	10.00	10.00	10.00
5.2.7	250 mm dia	RM.	12.00	12.00	12.00
5.2.8	315 mm dia	RM.	12.00	12.00	12.00
5.3	Providing, Solvent Cement Joints to PVC Pipes and fittings of 6, 8 and 10 Kg/Sq cm. Pressure including testing of joints and cost of jointing materials (i.e. socket, coupler & solvent cement)		6Kg/Cm ²	8 Kg/Cm ²	10Kg/Cm ²
5.3.1	90 mm dia.	Each	21.00	21.00	21.00
5.3.2	110 mm dia.	Each	23.00	23.00	23.00
5.3.3	140 mm dia.	Each	31.00	31.00	31.00
5.3.4	160 mm dia.	Each	36.00	36.00	36.00
5.3.5	180 mm dia.	Each	46.00	46.00	46.00
5.3.6	200 mm dia.	Each	55.00	55.00	55.00
5.3.7	250 mm dia	Each	79.00	79.00	79.00
5.3.8	315 mm dia	Each	92.00	92.00	92.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)		
5.4	Labour for providing solvent cement joints to PVC pipes and fittings of 6, 8 and 10Kg /Sq cm. Pressure including testing of joints but excluding cost of jointing materials (i.e. coupler and solvent cement)		6Kg/Cm ²	8 Kg/Cm ²	10Kg/Cm ²
5.4.1	90 mm dia.	Each	14.00	14.00	14.00
5.4.2	110 mm dia.	Each	14.00	14.00	14.00
5.4.3	140 mm dia.	Each	17.00	17.00	17.00
5.4.4	160 mm dia.	Each	21.00	21.00	21.00
5.4.5	180 mm dia.	Each	27.00	27.00	27.00
5.4.6	200 mm dia.	Each	34.00	34.00	34.00
5.4.7	250 mm dia	Each	48.00	48.00	48.00
5.4.8	315 mm dia	Each	55.00	55.00	55.00
5.5	Providing and laying in position following PVC bends suitable for 6, 8 and 10 Kg/Sq. cm. pressure pipes.		6Kg/Cm ²	8 Kg/Cm ²	10Kg/Cm ²
5.5.1	90 mm dia.	Each	142.00	209.00	271.00
5.5.2	110 mm dia.	Each	202.00	323.00	416.00
5.5.3	140 mm dia.	Each	599.00	730.00	1069.00
5.5.4	160 mm dia.	Each	861.00	1303.00	1400.00
5.5.5	180 mm dia.	Each	1093.00	1343.00	1908.00
5.5.6	200 mm dia.	Each	1480.00	2222.00	2198.00
5.5.7	250 mm dia	Each	3593.00	-	5895.00
5.5.8	315 mm dia	Each	7166.00	-	11693.00
5.6	Providing and laying in position following PVC Tees, suitable for 6, 8 and 10 Kg/Sqcm. Pressure pipes.		6Kg/Cm ²	8 Kg/Cm ²	10Kg/Cm ²
5.6.1	90 mm dia.	Each	78.00	105.00	125.00
5.6.2	100 mm dia.	Each	137.00	183.00	200.00
5.6.3	140 mm dia.	Each	226.00	265.00	316.00
5.6.4	160 mm dia.	Each	279.00	457.00	547.00
5.6.5	180 mm dia.	Each	487.00	561.00	672.00
5.6.6	200 mm dia.	Each	728.00	820.00	919.00
5.7	Providing and laying in position following PVC flanged tail pieces suitable for 6, 8 and 10 Kg./Sq. cm. Pressure pipes.		6Kg/Cm ²	8 Kg/Cm ²	10Kg/Cm ²
5.7.1	90 mm dia.	Each	60.00	91.00	118.00
5.7.2	110 mm dia.	Each	81.00	106.00	183.00
5.7.3	140 mm dia.	Each	131.00	140.00	285.00
5.7.4	160 mm dia.	Each	158.00	204.00	324.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)		
5.7.5	180 mm dia.	Each	164.00	213.00	368.00
5.7.6	200 mm dia.	Each	200.00	257.00	465.00
5.8	Providing and laying in position following PVC end Cap (plugs) suitable for 6, 8 and 10 Kg/Sq cm. Pressure pipes.		6Kg/Cm2	8 Kg/Cm2	10Kg/Cm2
5.8.1	90 mm dia.	Each	29.00	31.00	37.00
5.8.2	110 mm dia.	Each	37.00	45.00	58.00
5.8.3	140 mm dia.	Each	47.00	72.00	108.00
5.8.4	160 mm dia.	Each	91.00	106.00	145.00
5.8.5	180 mm dia.	Each	105.00	145.00	201.00
5.8.6	200 mm dia.	Each	148.00	168.00	217.00
5.9	Providing and laying in position PVC coupler suitable for 6, 8 and 10 Kg/Sq. cm. Pressure pipes.		6Kg/Cm2	8 Kg/Cm2	10Kg/Cm2
5.9.1	90 mm dia.	Each	51.00	68.00	72.00
5.9.2	110 mm dia.	Each	80.00	100.00	125.00
5.9.3	140 mm dia.	Each	149.00	204.00	228.00
5.9.4	160 mm dia.	Each	342.00	253.00	325.00
5.9.5	180 mm dia.	Each	268.00	360.00	399.00
5.9.6	200 mm dia	Each	343.00	449.00	566.00
5.9.7	250 mm dia	Each	806.00	-	1310.00
5.9.8	315 mm dia	Each	1599.00	-	2596.00
5.10	Providing and laying in position of following PVC Reducers suitable for 6, 8 and 10 Kg/Sq cm. Pressure pipes.		6Kg/Cm2	8 Kg/Cm2	10Kg/Cm2
5.10.1	110x90 mm dia.	Each	57.00	58.00	68.00
5.10.2	140x90 mm dia.	Each	76.00	85.00	85.00
5.10.3	160x90 mm dia.	Each	81.00	111.00	115.00
5.10.4	140x110 mm dia.	Each	75.00	97.00	126.00
5.10.5	160x110 mm dia.	Each	84.00	131.00	170.00
5.10.6	160x140 mm dia.	Each	88.00	208.00	240.00
5.10.7	180x90 mm dia	Each	111.00	142.00	170.00
5.10.8	180x110 mm dia	Each	118.00	179.00	241.00
5.10.9	180x140 mm dia	Each	138.00	207.00	283.00
5.10.10	180x160 mm dia	Each	154.00	236.00	313.00
5.10.11	200x110 mm dia.	Each	205.00	216.00	259.00
5.10.12	200x140 mm dia	Each	222.00	256.00	265.00
5.10.13	200x160 mm dia	Each	277.00	290.00	277.00
5.10.14	200x180 mm dia	Each	273.00	282.00	339.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)		
5.11	Labour for laying in position all types of PVC fittings such as bends, tees, plugs etc. for following PVC pipes.		6Kg/Cm ²	8 Kg/Cm ²	10Kg/Cm ²
5.11.1	90 mm dia.	Each	4.00	4.00	4.00
5.11.2	110 mm dia.	Each	4.00	4.00	4.00
5.11.3	140 mm dia.	Each	6.00	6.00	6.00
5.11.4	160 mm dia.	Each	6.00	6.00	6.00
5.11.5	180 mm dia.	Each	6.00	6.00	6.00
5.11.6	200 mm dia.	Each	6.00	6.00	6.00
	PVC -O Pipes				
5.12	Providing, laying, jointing, testing and commissioning of ISI marked PVC-O (Oriented Plasticized Polyvinyl Chloride) ring fit type pipe having orientation class 500 : C-1.4 with integral homogeneous spigot, elastomeric sealing ring made of EPDM rubber (one per pipe) including testing of joints, cost of jointing materials etc. Complete in all respect. Pressure Rating as per IS Code — IS:16647-2017 for following diameters.		PN-16	PN -20	PN-25
5.12.1	110 mm dia	RM	650.00	730.00	810.00
5.12.2	160 mm dia	RM	1089.00	1133.00	1177.00
5.12.3	200 mm dia	RM	1350.00	1475.00	1601.00
5.12.4	250 mm dia	RM	1900.00	2070.00	2241.00
5.12.5	315 mm dia	RM	2394.00	2945.00	3495.00
5.12.6	400 mm dia	RM	3652.00	4476.00	5300.00
5.13	Providing, laying, jointing, testing and commissioning of ISI marked PVC-O (Oriented Plasticized Polyvinyl Chloride) fittings PN 16/ PN 20/ PN 25 for above Pipes		11.25 deg. Bend	22.50 deg. Bend	45 deg. Bend
	Bends				
5.13.1	110	Each	2080.00	2080.00	2300.00
5.13.2	160	Each	4586.00	4586.00	5036.00
5.13.3	200	Each	8299.00	8299.00	9127.00
5.13.4	250	Each	12637.00	12637.00	14969.00
5.13.5	315	Each	24224.00	24224.00	26560.00
5.13.6	400	Each	45216.00	45216.00	51452.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
	Coupler		
5.13.7	110	Each	1995.00
5.13.8	160	Each	3558.00
5.13.9	200	Each	5143.00
5.13.10	250	Each	9627.00
5.13.11	315	Each	18248.00
5.13.12	400	Each	36584.00
	Reducer		
5.13.13	110 X 90	Each	2493.00
5.13.14	160x 110	Each	4092.00
5.13.15	160 x 140	Each	4104.00
5.13.16	200 x 160	Each	7079.00
5.13.17	250 x 200	Each	7751.00
5.13.18	315x250	Each	15812.00
5.13.19	400 x 315	Each	32822.00

CHAPTER-6

GALVANISED IRON PIPES, SPECIALS AND GUN METAL OR BRASS FITTINGS

- 1 The pipes (tubes) shall be galvanized mild steel hot finished seamless (HFS) or Electric resistance welded (ERW) or High Frequency Induction Welded(HFIW) or Hot Finished Welded (HFW), plain or screwed and socketed conforming to the requirements of IS 1239:2004 for light, medium & heavy grade. They shall be of the diameter (nominal bore) specified in the description of the item. The sockets shall be designated by the respective nominal bore of the pipes for which they are intended.
- 2 Galvanizing shall conform to IS 4736 : The zinc coating shall be uniform, adherent, reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots, pimples, lumping runs, rust stains, bulky white deposits and blisters. The pipes and sockets shall be cleanly finished, well galvanized in and out and free from cracks, surface flaws, laminations and other defects. All screw threads shall be clean and well cut. The ends shall be cut cleanly and square with the axis of the tube.
- 3 Marking
 - (i) Each tube shall be marked with manufacturer's name or trade-mark, IS No. i.e. IS 1239 (Part I) and class of tubes, i.e. is, L, M., and H, for light, medium and heavy class.
 - (ii) The different classes of tubes shall be distinguished by colour bands, which shall be applied as follows before the tubes leave the manufacturer's works :
- 4 Thickness, dimension & Mass of the tube shall be as per Class 8.1.1 of IS: 1239 - 2004.
- 5 Work shall be executed in accordance with the specifications in vogue in U.A.D.D. and all the relevant latest version of I.S. specifications detailed below :-

S.No.	IS Number	Title
1.	IS 1239 (PT-I) : 2004(Reaffirmation year 2019)	Mild steel tubes, tubular and other wrought steel fittings, Part-I Steel Tubes.
2.	IS 1239 (PT-II) : 2011(Reaffirmation year 2016)	Mild steel tubes, tubular and other wrought steel fittings, Part-II Mild steel tubular and other wrought steel pipes fittings.
3.	IS 1978 : 1982(Reaffirmation year 2002)	Line pipes
4.	IS 4736 : 1986(Reaffirmation year 2016)	Hot-dip zinc coating on mild steel tubes
5.	IS 778:1984 (Reaffirmed 2015)	Copper alloy gates, globe and check valves for water works purposes.
6.	IS 2692 : 1989(Reaffirmation year 2018)	Ferrules for water services - Specifications.

6 Laying of pipes and fittings/specials includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/ specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.

7 Measurement

(a) All measurements should be of the finished work.

(b) G.I. Pipes/ Valves are designated by Inner diameter.

8 Rates :

(i) The rates include charges for all tools and plants, other appliances etc. required for lifting and laying the pipes, specials and fittings in position as per approved drawings.

(ii) The rates include provision and use of all coverings etc. to protect the works from inclement weather etc. and from damages from fall of materials and other causes.

(iii) If the material is supplied by department, then it shall be issued from departmental store and no extra charges for carting the same from store to site of work shall be paid.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

**CHAPTER 6 - GALVANISED IRON PIPES, SPECIALS AND GUN METAL
OR BRASS FITTINGS**

S.No.	Particulars of Items	Unit	Rates (in Rs.)		
			Light	Medium	Heavy
6.1	Providing laying and jointing of galvanised Iron Pipes with specials (such as bends, elbows, tees etc) class light, medium & heavy including testing of joints, cost of pipes, specials and jointing materials all complete.		Light	Medium	Heavy
6.1.1	15mm dia	RM	108.00	113.00	123.00
6.1.2	20mm dia	RM	124.00	133.00	156.00
6.1.3	25mm dia	RM	172.00	185.00	227.00
6.1.4	32mm dia	RM	218.00	229.00	292.00
6.1.5	40mm dia	RM	277.00	277.00	344.00
6.1.6	50mm dia	RM	340.00	349.00	471.00
6.1.7	65mm dia	RM	465.00	453.00	620.00
6.1.8	80mm dia	RM	548.00	585.00	758.00
6.1.9	100mm dia	RM	777.00	919.00	1087.00
6.1.10	125mm dia	RM	-	1207.00	1344.00
6.1.11	150mm dia	RM	-	1426.00	1618.00
6.2	Labour for laying and jointing of galvanised Iron pipes with specials (such as bends, elbows, tees etc) class light, medium & heavy including testing of joints and cost of jointing materials but excluding cost of pipes & specials.		Light	Medium	Heavy
6.2.1	15mm dia	RM	12.00	12.00	12.00
6.2.2	20mm dia	RM	12.00	12.00	12.00
6.2.3	25mm dia	RM	19.00	19.00	19.00
6.2.4	32mm dia	RM	22.00	22.00	22.00
6.2.5	40mm dia	RM	28.00	28.00	28.00
6.2.6	50mm dia	RM	35.00	35.00	48.00
6.2.7	65mm dia	RM	55.00	55.00	69.00
6.2.8	80mm dia	RM	58.00	62.00	76.00
6.2.9	100mm dia	RM	83.00	90.00	97.00
6.2.10	125mm dia	RM	83.00	111.00	125.00
6.2.11	150mm dia	RM	83.00	152.00	152.00
6.3	Providing and fixing full way gate valves tested to 21.00 kg/sq.cm.		Screwed	Flanged	
6.3.1	15mm dia	Each	157.00	233.00	
6.3.2	20mm dia	Each	245.00	412.00	
6.3.3	25mm dia	Each	282.00	541.00	
6.3.4	32mm dia	Each	426.00	584.00	

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
6.3.5	40mm dia	Each	571.00	691.00
6.3.6	50mm dia	Each	858.00	1289.00
6.3.7	65mm dia	Each	1609.00	3299.00
6.3.8	80mm dia	Each	2476.00	4143.00
6.3.9	100mm dia	Each	5356.00	6014.00
6.4	Providing and fixing full way gate valves tested to 21.00 kg/sq.cm.		Screwed	Flanged
6.4.1	15mm dia	Each	218.00	234.00
6.4.2	20mm dia	Each	422.00	438.00
6.4.3	25mm dia	Each	476.00	491.00
6.4.4	32mm dia	Each	571.00	585.00
6.4.5	40mm dia	Each	687.00	697.00
6.4.6	50mm dia	Each	1254.00	1303.00
6.4.7	65mm dia	Each	2881.00	2895.00
6.4.8	80mm dia	Each	4064.00	4204.00
6.4.9	100mm dia	Each	6098.00	6134.00
6.5	Providing and fixing class-I Globe wheel valves, tested to 21.09 kg/sq.cm.		Screwed	Flanged
6.5.1	15mm dia	Each	216.00	260.00
6.5.2	20mm dia	Each	227.00	323.00
6.5.3	25mm dia	Each	248.00	350.00
6.5.4	32mm dia	Each	333.00	488.00
6.5.5	40mm dia	Each	568.00	647.00
6.5.6	50mm dia	Each	766.00	1060.00
6.5.7	65mm dia	Each	1266.00	1742.00
6.5.8	80mm dia	Each	1466.00	3248.00
6.5.9	100mm dia	Each	4421.00	5258.00
6.6	Providing and fixing class-II Globe wheel valves, tested to 21.09 kg/sq.cm.		Screwed	Flanged
6.6.1	15mm dia	Each	255.00	267.00
6.6.2	20mm dia	Each	321.00	326.00
6.6.3	25mm dia	Each	351.00	359.00
6.6.4	32mm dia	Each	480.00	485.00
6.6.5	40mm dia	Each	639.00	653.00
6.6.6	50mm dia	Each	1071.00	1075.00
6.6.7	65mm dia	Each	1537.00	1750.00
6.6.8	80mm dia	Each	3158.00	3237.00
6.6.9	100mm dia	Each	5077.00	5242.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
6.7	Providing and fixing gun metal/ brass check (non-return) valves Class-I, female ends, tested to 21.09 kg/sq.cm.		Screwed	Flanged
6.7.1	15mm dia	Each	116.00	299.00
6.7.2	20mm dia	Each	163.00	315.00
6.7.3	25mm dia	Each	243.00	360.00
6.7.4	32mm dia	Each	346.00	550.00
6.7.5	40mm dia	Each	442.00	804.00
6.7.6	50mm dia	Each	572.00	921.00
6.7.7	65mm dia	Each	711.00	1400.00
6.7.8	80mm dia	Each	1656.00	2159.00
6.7.9	100mm dia	Each	2786.00	2752.00
6.8	Providing and fixing gun metal/ brass check (non-return) valves Class-II, female ends, tested to 21.09 kg/sq.cm.		Screwed	Flanged
6.8.1	15mm dia	Each	297.00	296.00
6.8.2	20mm dia	Each	308.00	310.00
6.8.3	25mm dia	Each	360.00	363.00
6.8.4	32mm dia	Each	553.00	550.00
6.8.5	40mm dia	Each	819.00	818.00
6.8.6	50mm dia	Each	1034.00	1008.00
6.8.7	65mm dia	Each	2129.00	1444.00
6.8.8	80mm dia	Each	2164.00	2159.00
6.8.9	100mm dia	Each	2727.00	2734.00
6.9	Providing and fixing GM or brass ferrules, tested to 21.09 kg/sq.cm. i/c boring and tapping the main		Screwed	
6.9.1	15mm dia	Each	416.00	
6.9.2	20mm dia	Each	723.00	
6.9.3	25mm dia	Each	957.00	
6.9.4	32mm dia	Each	1402.00	
6.9.5	40mm dia	Each	1990.00	
6.9.6	50mm dia	Each	2633.00	
6.10	Labour for laying and fixing Screwed or flanged full way gate valves Class-I		Screwed	Flanged
6.10.1	15mm dia	Each	14.00	15.00
6.10.2	20mm dia	Each	16.00	19.00
6.10.3	25mm dia	Each	16.00	24.00
6.10.4	32mm dia	Each	19.00	26.00
6.10.5	40mm dia	Each	24.00	27.00
6.10.6	50mm dia	Each	41.00	54.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)	
6.10.7	65mm dia	Each	81.00	135.00
6.10.8	80mm dia	Each	122.00	203.00
6.10.9	100mm dia	Each	216.00	270.00
6.11	Labour for laying and fixing Screwed or flanged full way gate valves Class-II		Screwed	Flanged
6.11.1	15mm dia	Each	15.00	15.00
6.11.2	20mm dia	Each	19.00	19.00
6.11.3	25mm dia	Each	24.00	24.00
6.11.4	32mm dia	Each	26.00	26.00
6.11.5	40mm dia	Each	27.00	27.00
6.11.6	50mm dia	Each	54.00	54.00
6.11.7	65mm dia	Each	135.00	135.00
6.11.8	80mm dia	Each	203.00	203.00
6.11.9	100mm dia	Each	270.00	270.00
6.12	Labour for laying and fixing Screwed or flanged globe wheel valves Class-I		Screwed	Flanged
6.12.1	15mm dia	Each	14.00	14.00
6.12.2	20mm dia	Each	14.00	14.00
6.12.3	25mm dia	Each	14.00	16.00
6.12.4	32mm dia	Each	14.00	22.00
6.12.5	40mm dia	Each	19.00	32.00
6.12.6	50mm dia	Each	38.00	49.00
6.12.7	65mm dia	Each	54.00	81.00
6.12.8	80mm dia	Each	68.00	122.00
6.12.9	100mm dia	Each	120.00	172.00
6.13	Labour for laying and fixing Screwed or flanged globe wheel valves Class-II		Screwed	Flanged
6.13.1	15mm dia	Each	14.00	14.00
6.13.2	20mm dia	Each	14.00	14.00
6.13.3	25mm dia	Each	16.00	16.00
6.13.4	32mm dia	Each	22.00	22.00
6.13.5	40mm dia	Each	32.00	32.00
6.13.6	50mm dia	Each	49.00	49.00
6.13.7	65mm dia	Each	81.00	81.00
6.13.8	80mm dia	Each	122.00	122.00
6.13.9	100mm dia	Each	162.00	162.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)		
			Screwed	Flanged	
6.14	Labour for laying and fixing Screwed or flanged check (non-return) valves Class-I		Screwed	Flanged	
6.14.1	15mm dia	Each	7.00	14.00	
6.14.2	20mm dia	Each	7.00	14.00	
6.14.3	25mm dia	Each	14.00	18.00	
6.14.4	32mm dia	Each	14.00	24.00	
6.14.5	40mm dia	Each	19.00	38.00	
6.14.6	50mm dia	Each	24.00	38.00	
6.14.7	65mm dia	Each	35.00	59.00	
6.14.8	80mm dia	Each	70.00	95.00	
6.14.9	100mm dia	Each	108.00	122.00	
6.15	Labour for laying and fixing Screwed or flanged check (non-return) valves Class-II,		Screwed	Flanged	
6.15.1	15mm dia	Each	14.00	14.00	
6.15.2	20mm dia	Each	14.00	14.00	
6.15.3	25mm dia	Each	18.00	18.00	
6.15.4	32mm dia	Each	24.00	24.00	
6.15.5	40mm dia	Each	38.00	38.00	
6.15.6	50mm dia	Each	38.00	38.00	
6.15.7	65mm dia	Each	59.00	59.00	
6.15.8	80mm dia	Each	95.00	95.00	
6.15.9	100mm dia	Each	122.00	122.00	
6.16	Labour for laying and fixing GM or brass ferrules		Screwed		
6.16.1	15mm dia	Each	122.00		
6.16.2	20mm dia	Each	189.00		
6.16.3	25mm dia	Each	243.00		
6.16.4	32mm dia	Each	379.00		
6.16.5	40mm dia	Each	541.00		
6.16.6	50mm dia	Each	703.00		
6.17	Providing & fixing water taps		Stainless Steel	CI self closing	Brass Heavy Duty
6.17.1	15mm dia	Each	676.00	438.00	436.00
6.17.2	20mm dia	Each	754.00	492.00	488.00
6.17.3	25mm dia	Each	771.00	526.00	543.00
6.18	Labour for laying & fixing water taps		Stainless Steel	CI self closing	Brass Heavy Duty
6.18.1	15mm dia	Each	46.00	46.00	46.00
6.18.2	20mm dia	Each	46.00	46.00	46.00
6.18.3	25mm dia	Each	46.00	46.00	46.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
6.19	Painting G.I. pipes and fittings with synthetic enamel white paint over a ready mixed priming coat, both of approved quality for new work :		
6.19.1	15 mm diameter pipe. -	Meter	9.00
6.19.2	20 mm diameter pipe.	Meter	10.00
6.19.3	25 mm diameter pipe	Meter	14.00
6.19.4	32 mm diameter pipe.	Meter	16.00
6.19.5	40 mm diameter pipe.	Meter	19.00
6.19.6	50 mm diameter pipe.	Meter	23.00
6.20	Repainting G.I. pipes and fittings with synthetic enamel white paint of approved quality :		
6.20.1	15 mm diameter pipe.	Meter	5.00
6.20.2	20 mm diameter pipe.	Meter	5.00
6.20.3	25 mm diameter pipe	Meter	7.00
6.20.4	32 mm diameter pipe.	Meter	8.00
6.20.5	40 mm diameter pipe.	Meter	9.00
6.20.6	50 mm diameter pipe.	Meter	11.00
6.21	Painting G.I. pipes and fittings with two coats of anti-corrosive bitumastic paint of approved quality :		
6.21.1	15 mm diameter pipe.	Meter	5.00
6.21.2	20 mm diameter pipe.	Meter	6.00
6.21.3	25 mm diameter pipe	Meter	7.00
6.21.4	32 mm diameter pipe.	Meter	9.00
6.21.5	40 mm diameter pipe.	Meter	10.00
6.21.6	50 mm diameter pipe.	Meter	11.00
6.21.7	65 mm diameter pipe	Meter	14.00
6.21.8	80 mm diameter pipe	Meter	16.00
6.22	Providing and fixing G.I. Union in G.I. pipe line including cutting and threading the pipe and making long screws etc complete (new work) :		
6.22.1	15 mm diameter pipe.	Each	135.00
6.22.2	20 mm diameter pipe.	Each	161.00
6.22.3	25 mm diameter pipe	Each	174.00
6.22.4	32 mm diameter pipe.	Each	214.00
6.22.5	40 mm diameter pipe.	Each	260.00
6.22.6	50 mm diameter pipe.	Each	348.00
6.22.7	65 mm diameter pipe	Each	625.00
6.22.8	80 mm diameter pipe	Each	747.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
6.23	Providing and fixing G.I. Union in existing G.I. pipe line, cutting and threading the pipe and making long screws including excavation, refilling the earth or cutting of wall and making good the same complete wherever required :		
6.23.1	15 mm diameter pipe.	Each	289.00
6.23.2	20 mm diameter pipe.	Each	316.00
6.23.3	25 mm diameter pipe	Each	329.00
6.23.4	32 mm diameter pipe.	Each	369.00
6.23.5	40 mm diameter pipe.	Each	415.00
6.23.6	50 mm diameter pipe.	Each	559.00
6.23.7	65 mm diameter pipe	Each	836.00
6.23.8	80 mm diameter pipe	Each	958.00
6.24	Providing and fixing C.I. double acting air valve of approved quality with bolts, nuts, rubber insertions etc. complete (The tail pieces, tapers etc if required will be paid separately) :		
6.24.1	50 mm diameter	Each	2462.00
6.24.2	80 mm diameter	Each	3502.00
6.24.3	100 mm diameter	Each	4285.00
6.25	Providing and fixing G. I. socket in G.I. Pipe line i/c cutting threading testing etc. complete (Old work)		
6.25.1	15mm dia	Each	22.00
6.25.2	20mm dia	Each	33.00
6.25.3	25mm dia	Each	41.00
6.25.4	32mm dia	Each	62.00
6.25.5	40mm dia	Each	79.00
6.25.6	50mm dia	Each	128.00
6.25.7	65mm dia	Each	190.00
6.25.8	80mm dia	Each	285.00
6.25.9	100mm dia	Each	463.00
6.25.10	125mm dia	Each	1388.00
6.25.11	150mm dia	Each	1818.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
6.26	Labour only for fixing G.I. socket in G.I. Pipe line i/c cutting threading, testing and carriage of etc. complete . (Old work)		
6.26.1	15mm dia	Each	7.00
6.26.2	20mm dia	Each	11.00
6.26.3	25mm dia	Each	14.00
6.26.4	32mm dia	Each	20.00
6.26.5	40mm dia	Each	25.00
6.26.6	50mm dia	Each	41.00
6.26.7	65mm dia	Each	52.00
6.26.8	80mm dia	Each	77.00
6.26.9	100mm dia	Each	129.00
6.26.10	125mm dia	Each	176.00
6.26.11	150mm dia	Each	204.00
6.27	Providing and fixing G. I. Bend 90 degree in G.I. Pipe line i/c cutting threading testing etc. complete (Old work)		
6.27.1	15mm dia	Each	45.00
6.27.2	20mm dia	Each	69.00
6.27.3	25mm dia	Each	106.00
6.27.4	32mm dia	Each	182.00
6.27.5	40mm dia	Each	274.00
6.27.6	50mm dia	Each	408.00
6.27.7	65mm dia	Each	955.00
6.27.8	80mm dia	Each	1568.00
6.27.9	100mm dia	Each	2091.00
6.27.10	125mm dia	Each	2491.00
6.27.11	150mm dia	Each	2658.00
6.28	Labour only for fixing G. I. Bend 90 degree in G.I. Pipe line i/c cutting threading, testing and carriage etc. complete (Old work)		
6.28.1	15mm dia	Each	13.00
6.28.2	20mm dia	Each	19.00
6.28.3	25mm dia	Each	34.00
6.28.4	32mm dia	Each	55.00
6.28.5	40mm dia	Each	66.00
6.28.6	50mm dia	Each	100.00
6.28.7	65mm dia	Each	124.00
6.28.8	80mm dia	Each	146.00
6.28.9	100mm dia	Each	415.00
6.28.10	125mm dia	Each	478.00
6.28.11	150mm dia	Each	580.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
6.29	Providing and fixing G. I. Tee in G.I. Pipe line i/c cutting threading testing etc. complete (Old work)		
6.29.1	15mm dia	Each	46.00
6.29.2	20mm dia	Each	73.00
6.29.3	25mm dia	Each	96.00
6.29.4	32mm dia	Each	154.00
6.29.5	40mm dia	Each	200.00
6.29.6	50mm dia	Each	319.00
6.29.7	65mm dia	Each	556.00
6.29.8	80mm dia	Each	765.00
6.29.9	100mm dia	Each	1338.00
6.30	Labour only for fixing G. I. Tee in G.I. Pipe line i/c cutting threading, testing and carriage etc. complete (Old work)		
6.30.1	15mm dia	Each	20.00
6.30.2	20mm dia	Each	34.00
6.30.3	25mm dia	Each	45.00
6.30.4	32mm dia	Each	77.00
6.30.5	40mm dia	Each	98.00
6.30.6	50mm dia	Each	165.00
6.30.7	65mm dia	Each	278.00
6.30.8	80mm dia	Each	358.00
6.30.9	100mm dia	Each	661.00
6.31	Providing and fixing G. I. Elbow in G.I. Pipe line i/c cutting threading testing etc. complete (Old work)		
6.31.1	15mm dia	Each	31.00
6.31.2	20mm dia	Each	50.00
6.31.3	25mm dia	Each	72.00
6.31.4	32mm dia	Each	113.00
6.31.5	40mm dia	Each	147.00
6.31.6	50mm dia	Each	244.00
6.31.7	65mm dia	Each	420.00
6.31.8	80mm dia	Each	583.00
6.31.9	100mm dia	Each	1053.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
6.32	Labour only for fixing G. I. Elbow in G.I. Pipe line i/c cutting threading testing etc. complete (Old work)		
6.32.1	15mm dia	Each	15.00
6.32.2	20mm dia	Each	25.00
6.32.3	25mm dia	Each	33.00
6.32.4	32mm dia	Each	55.00
6.32.5	40mm dia	Each	69.00
6.32.6	50mm dia	Each	128.00
6.32.7	65mm dia	Each	200.00
6.32.8	80mm dia	Each	271.00
6.32.9	100mm dia	Each	524.00
6.33	Providing and fixing G. I. Nipple of minimum length 100mm in G.I. Pipe line i/c cutting, threading, testing and carriage etc. complete (Old work)		
6.33.1	15mm dia	Each	26.00
6.33.2	20mm dia	Each	38.00
6.33.3	25mm dia	Each	57.00
6.33.4	32mm dia	Each	91.00
6.33.5	40mm dia	Each	112.00
6.33.6	50mm dia	Each	169.00
6.33.7	65mm dia	Each	305.00
6.33.8	80mm dia	Each	454.00
6.33.9	100mm dia	Each	839.00
6.34	Labour only for fixing G.I. Nipple of minimum length 100mm in G.I. Pipe line i/c cutting threading testing etc. complete (Old work)		
6.34.1	15mm dia	Each	11.00
6.34.2	20mm dia	Each	14.00
6.34.3	25mm dia	Each	20.00
6.34.4	32mm dia	Each	34.00
6.34.5	40mm dia	Each	43.00
6.34.6	50mm dia	Each	60.00
6.34.7	65mm dia	Each	110.00
6.34.8	80mm dia	Each	165.00
6.34.9	100mm dia	Each	306.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
6.35	Providing and fixing wrought steel Cap Plug with threading in G.I. Pipe line testing etc. complete (New & Old Work)		
6.35.1	15mm dia	Each	29.00
6.35.2	20mm dia	Each	41.00
6.35.3	25mm dia	Each	67.00
6.35.4	32mm dia	Each	90.00
6.35.5	40mm dia	Each	125.00
6.35.6	50mm dia	Each	190.00
6.35.7	65mm dia	Each	298.00
6.35.8	80mm dia	Each	412.00
6.35.9	100mm dia	Each	597.00
6.36	Labour only for fixing wrought steel Cap Plug with threading in G.I. Pipe line, testing and carriage etc. complete (Old work)		
6.36.1	15mm dia	Each	13.00
6.36.2	20mm dia	Each	18.00
6.36.3	25mm dia	Each	29.00
6.36.4	32mm dia	Each	38.00
6.36.5	40mm dia	Each	50.00
6.36.6	50mm dia	Each	69.00
6.36.7	65mm dia	Each	88.00
6.36.8	80mm dia	Each	141.00
6.36.9	100mm dia	Each	240.00
6.37	Providing and fixing G. I. Cross with outer threading in G.I. Pipe line i/c cutting threading testing etc. complete		
6.37.1	15mm dia	Each	67.00
6.37.2	20mm dia	Each	96.00
6.37.3	25mm dia	Each	145.00
6.37.4	32mm dia	Each	232.00
6.37.5	40mm dia	Each	308.00
6.37.6	50mm dia	Each	470.00
6.38	Labour only for fixing G. I. cross outer threading in G.I. Pipe line i/c cutting, threading, testing and carriage etc. complete (Old work)		
6.38.1	15mm dia	Each	32.00
6.38.2	20mm dia	Each	44.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
6.38.3	25mm dia	Each	64.00
6.38.4	32mm dia	Each	98.00
6.38.5	40mm dia	Each	126.00
6.38.6	50mm dia	Each	196.00
6.39	Providing and fixing Tank Nipple with outer threading in G.I. Pipe line i/c cutting threading testing etc. complete		
6.39.1	15mm dia	Each	56.00
6.39.2	20mm dia	Each	83.00
6.39.3	25mm dia	Each	115.00
6.39.4	32mm dia	Each	187.00
6.39.5	40mm dia	Each	284.00
6.39.6	50mm dia	Each	395.00
6.40	Labour only for Tank Nipple with outer threading in G.I. Pipe line i/c cutting, threading, testing and carriage etc. complete		
6.40.1	15mm dia	Each	12.00
6.40.2	20mm dia	Each	18.00
6.40.3	25mm dia	Each	27.00
6.40.4	32mm dia	Each	37.00
6.40.5	40mm dia	Each	48.00
6.40.6	50mm dia	Each	76.00

CHAPTER- 7

HDPE Pipes, MDPE Pipe & Specials

- 1 High Density polyethylene pipes for Water Supply shall be as per IS : 4984:2016
- 2 Rubber sealing rings for gas mains, water mains and sewers shall be as per IS : 5382:2018
- 3 Laying & jointing of polyethylene (PE) Pipes shall be as per IS 7634 (Part-3) - 2003, IS 7634:(PART2):2012
- 4 Providing and supplying Blue MDPE pipes shall be conforming to ISO 4427-1:2019
- 5 Providing and Supply of Electro Fusion Tapping Ferrule(Branch Tapping Saddle) female BSP Threaded with SS 304 insert fittings shall be in accordance with BS EN 12201-part3
- 6 Providing and Supply of PVC Ball Valves in PN-16 shall be conforming to ISO 4422-4
- 7 Colour

The colour of the HDPE pipe shall be black with blue identification stripes for the purpose of identification of the pipes covered in this standard. **Identification Stripes:** Each black pipe with shall contain minimum three longitudinal stripes of width 3 mm (Min) in blue colour, circumferentially distributed. These stripes shall be co-extruded during pipe manufacturing and shall not preferably be more than 0.2mm in depth for wall thickness up to 10mm and 0.5mm beyond 10 mm. The material of the stripes shall be of the same type as used in the base compound for the pipe

8 Length of straight Pipe & marking on pipe.

- 8.1 The length of straight pipe shall be 5m to 20m or as agreed by Engineer in charge. Short lengths of 3 meter (minimum) up to a Maximum of 10 % of the total supply may be permitted.
- 8.2 Each straight length of pipe shall be clearly marked in indelible ink/paint on either end and for coil at both ends or hot embossed on white base every meter throughout the length of pipe/coil with the following information:
 - (a) Manufacturer's name/Trade-mark,
 - (b) Material Designation.
 - (c) Pressure rating
 - (d) Standard dimension ratio
 - (e) Outside diameter
 - (f) Lot No./Batch No. containing information of date of manufacture
 - (g) BIS certification marking on each pipe.

9 Visual Appearance

The internal and external surfaces of the pipes shall be smooth, clean and free from grooving and other defects. The ends of pipes shall be cleanly cut square with axis of the pipes to within the tolerances given below and free from deformity. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible provided that the wall thickness remains within the permissible limits.

10 Handling, Transportation storage and Lowering of pipes.

- If transportation of HDPE pipes from a distance greater than 300km than pipes shall be received only when bare coils of pipe have been wrapped with Hessian cloth.
- The truck for transportation of the PE pipes shall be exclusively used for PE pipes only with no other material loaded-especially no metallic, glass and wooden items. The truck shall not have sharp edges that can damage the pipe.
- At the time of opening coils it must be remembered that the coils are under tension and must be open in control manner
- Straight length should be stored on horizontal racks giving continuous support.
- Loss/damages during transit, handling, storage will be to the contractor's account.

11 Fittings and specials :

All HDPE fittings/specials shall be fabricated or injection moulded at factory as per IS: 8360 (Part-I & Part-III) and as per IS: 8008 (Part-I to Part-IX). Fittings will be butt welded on the pipes or other fittings by use of heat fusion.

12 The rate for Item of HDPE Reducer, STEP-I, STEP-II, STEP-III shall be explained as follows :-

Reducer	STEP I	STEP II	STEP III
40 mm dia	50x40	63x40	75x40
50 mm dia	63x50	75x50	90x50
63 mm dia	75x63	90x63	110x63

13 Test to Establish Perfectibility/portability of work

Specimen of pipe shall be tested to establish the suitability for use in carrying potable water

- (i) Smell of the extract
- (ii) Clarity of the colour of the extract
- (iii) Acidity and Alkalinity
- (iv) Global migration UV absorbing material Heavy metals
- (v) Unreacted monomers (styrens) and biological tests

14 Hydraulic Test

After laying the pipe hydraulic test shall be done to conform the quality of work and material. There should not be any signs of localized swelling, leakage or weeping.

15 Laying of pipes and fittings/specials includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/ specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.

16 Providing and supply of MDPE pipes house services connections with necessary Electro Fusion & Compression fittings are also given. MDPE pipes conforming to ISO 4427:1996 with quality assurance certificates from WRAS/CIPET etc, are used. Electro Fusion & compression fittings are to be used as per ISO norms as given in the relevant items.

17 Measurement

(a) The net length of fixed pipe shall be measured in running meters correct to 10mm. The portion of the pipe inside the joints shall not be included in the length of pipe work. Specials shall be excluded and measured and paid separately under the relevant item.

(b) HDPE & MDPE Pipes & Fitting are designated by Outer diameter.

18 Rates :

The rate shall include the cost of the material and labour involve in all operations described in the item.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 7 -- HDPE Pipes, MDPE Pipe & Specials

S.No	Particulars of Items	Unit	Rate (in Rs.)		
7.1	Providing, laying, Jointing & field testing of High Density Polyethylene pipes, (HDPE) confirming to IS 4984/ 14151/ 12786/ 13488 with necessary jointing material like mechanical connector or jointing pipes by heating to the ends of pipes with the help of Teflon coated electric mirror/ heater to the required temperature and then pressing the ends together against each other, to form a monolithic & leak proof joint by thermosetting process. It may be required to be done with Jacks/Hydraulic Jacks/ But fusion machine. (50mm & above fusion jointed & below 50mm mechanical jointed)		6 Kg/sq.cm :	8 Kg/sq.cm :	10 Kg/sq.cm :
	PE-100				
7.1.1	20 mm dia	RM	38.00	39.00	40.00
7.1.2	25 mm dia	RM	45.00	47.00	49.00
7.1.3	32 mm dia	RM	56.00	58.00	58.00
7.1.4	40 mm dia	RM	70.00	74.00	85.00
7.1.5	50 mm dia	RM	83.00	101.00	119.00
7.1.6	63 mm dia	RM	127.00	157.00	187.00
7.1.7	75 mm dia	RM	181.00	221.00	264.00
7.1.8	90 mm dia	RM	247.00	310.00	371.00
7.1.9	110 mm dia	RM	354.00	456.00	544.00
7.1.10	125 mm dia	RM	460.00	585.00	700.00
7.1.11	140 mm dia	RM	572.00	726.00	872.00
7.1.12	160 mm dia	RM	743.00	945.00	1141.00
7.1.13	180 mm dia	RM	933.00	1191.00	1450.00
7.1.14	200 mm dia	RM	1151.00	1468.00	1782.00
7.1.15	225 mm dia	RM	1457.00	1858.00	2224.00
7.1.16	250 mm dia	RM	1786.00	2281.00	2742.00
7.1.17	280 mm dia	RM	2225.00	2849.00	3408.00
7.1.18	315 mm dia	RM	2812.00	3598.00	4329.00
7.1.19	355 mm dia	RM	3579.00	4591.00	5566.00
7.1.20	400 mm dia	RM	4619.00	5924.00	7173.00
7.1.21	450 mm dia	RM	5846.00	7524.00	9074.00
7.1.22	500 mm dia	RM	7245.00	9260.00	11032.00
7.1.23	560 mm dia	RM	9029.00	11610.00	14015.00
7.1.24	630 mm dia	RM	11438.00	14723.00	17872.00
7.1.25	710 mm dia	RM	11575.20	14906.00	18500.00

S.No	Particulars of Items	Unit	Rate (in Rs.)		
			6 Kg/sq.cm :	8 Kg/sq.cm :	10 Kg/sq.cm :
7.2	Providing and laying Bend 90° confirming to IS specifications.				
7.2.1	20 mm dia	Each	37.00	39.00	40.00
7.2.2	25 mm dia	Each	41.00	43.00	45.00
7.2.3	32 mm dia	Each	50.00	52.00	54.00
7.2.4	40 mm dia	Each	55.00	57.00	59.00
7.2.5	50 mm dia	Each	72.00	77.00	84.00
7.2.6	63 mm dia	Each	101.00	105.00	137.00
7.2.7	75 mm dia	Each	154.00	158.00	178.00
7.2.8	90 mm dia	Each	229.00	242.00	276.00
7.2.9	110 mm dia	Each	290.00	331.00	357.00
7.2.10	125 mm dia	Each	416.00	398.00	595.00
7.2.11	140 mm dia	Each	558.00	690.00	808.00
7.2.12	160 mm dia	Each	791.00	985.00	1165.00
7.2.13	180 mm dia	Each	1103.00	1358.00	1615.00
7.2.14	200 mm dia	Each	1437.00	1816.00	2167.00
7.2.15	225 mm dia	Each	2008.00	2535.00	3044.00
7.2.16	250 mm dia	Each	2709.00	3435.00	4121.00
7.2.17	280 mm dia	Each	3747.00	4782.00	5736.00
7.2.18	315 mm dia	Each	5275.00	6749.00	8142.00
7.2.19	355 mm dia	Each	7528.00	9554.00	11558.00
7.2.20	400 mm dia	Each	10877.00	13974.00	16894.00
7.2.21	450 mm dia	Each	15442.00	19796.00	23814.00
7.2.22	500 mm dia	Each	21093.00	27113.00	32764.00
7.2.23	560 mm dia	Each	29354.00	38046.00	44532.00
7.2.24	630 mm dia	Each	40591.00	52365.00	63318.00
7.2.25	710 mm dia	Each	57998.00	74589.00	90691.00
7.3	Providing and laying Bend 45° confirming to IS specifications.				
7.3.1	20 mm dia	Each	37.00	39.00	40.00
7.3.2	25 mm dia	Each	39.00	41.00	44.00
7.3.3	32 mm dia	Each	40.00	43.00	49.00
7.3.4	40 mm dia	Each	47.00	53.00	59.00
7.3.5	50 mm dia	Each	66.00	66.00	84.00
7.3.6	63 mm dia	Each	113.00	111.00	145.00
7.3.7	75 mm dia	Each	172.00	171.00	220.00
7.3.8	90 mm dia	Each	242.00	242.00	317.00
7.3.9	110 mm dia	Each	337.00	338.00	482.00
7.3.10	125 mm dia	Each	472.00	371.00	710.00
7.3.11	140 mm dia	Each	679.00	498.00	1007.00
7.3.12	160 mm dia	Each	970.00	692.00	1436.00
7.3.13	180 mm dia	Each	1303.00	944.00	1954.00
7.3.14	200 mm dia	Each	1712.00	1253.00	2581.00

S.No	Particulars of Items	Unit	Rate (in Rs.)		
7.3.15	225 mm dia	Each	2399.00	1735.00	3633.00
7.3.16	250 mm dia	Each	3215.00	2337.00	4899.00
7.3.17	280 mm dia	Each	4401.00	3229.00	6615.00
7.3.18	315 mm dia	Each	6716.00	4555.00	10122.00
7.3.19	355 mm dia	Each	9721.00	6135.00	14624.00
7.3.20	400 mm dia	Each	12633.00	7942.00	21082.00
7.3.21	450 mm dia	Each	17285.00	10148.00	27009.00
7.3.22	500 mm dia	Each	24096.00	12475.00	37927.00
7.3.23	560 mm dia	Each	33550.00	15615.00	38140.00
7.3.24	630 mm dia	Each	41626.00	19533.00	38668.00
7.3.25	710 mm dia	Each	48510.00	20175.00	39333.00
7.4	Providing and laying Equal Tee conforming to IS specifications.		6 Kg/sq.cm :	8 Kg/sq.cm :	10 Kg/sq.cm :
7.4.1	20 mm dia	Each	39.00	41.00	43.00
7.4.2	25 mm dia	Each	48.00	51.00	53.00
7.4.3	32 mm dia	Each	50.00	53.00	55.00
7.4.4	40 mm dia	Each	54.00	59.00	61.00
7.4.5	50 mm dia	Each	74.00	80.00	93.00
7.4.6	63 mm dia	Each	120.00	129.00	144.00
7.4.7	75 mm dia	Each	196.00	146.00	244.00
7.4.8	90 mm dia	Each	334.00	336.00	403.00
7.4.9	110 mm dia	Each	467.00	487.00	562.00
7.4.10	125 mm dia	Each	524.00	649.00	760.00
7.4.11	140 mm dia	Each	708.00	882.00	1041.00
7.4.12	160 mm dia	Each	1016.00	1276.00	1513.00
7.4.13	180 mm dia	Each	1402.00	1767.00	2110.00
7.4.14	200 mm dia	Each	1875.00	2374.00	2855.00
7.4.15	225 mm dia	Each	2639.00	3333.00	4006.00
7.4.16	250 mm dia	Each	3543.00	4524.00	5430.00
7.4.17	280 mm dia	Each	4935.00	6289.00	7589.00
7.4.18	315 mm dia	Each	7000.00	8954.00	10784.00
7.4.19	355 mm dia	Each	9937.00	12708.00	15354.00
7.4.20	400 mm dia	Each	14382.00	18488.00	24561.00
7.4.21	450 mm dia	Each	19540.00	25139.00	33257.00
7.4.22	500 mm dia	Each	28041.00	36052.00	46430.00
7.4.23	560 mm dia	Each	39178.00	48951.00	64870.00
7.4.24	630 mm dia	Each	53906.00	69572.00	92685.00
7.4.25	710 mm dia	Each	77167.00	99075.00	132412.00

S.No	Particulars of Items	Unit	Rate (in Rs.)		
			6 Kg/sq.cm :	8 Kg/sq.cm :	10.0 Kg/sq.cm :
7.5	Providing and laying Pipe end confirming to IS specifications.		6 Kg/sq.cm :	8 Kg/sq.cm :	10.0 Kg/sq.cm :
7.5.1	20 mm dia	Each	51.00	53.00	55.00
7.5.2	25 mm dia	Each	53.00	56.00	58.00
7.5.3	32 mm dia	Each	56.00	59.00	65.00
7.5.4	40 mm dia	Each	58.00	70.00	69.00
7.5.5	50 mm dia	Each	74.00	76.00	79.00
7.5.6	63 mm dia	Each	94.00	97.00	99.00
7.5.7	75 mm dia	Each	123.00	133.00	133.00
7.5.8	90 mm dia	Each	174.00	195.00	195.00
7.5.9	110 mm dia	Each	212.00	246.00	246.00
7.5.10	125 mm dia	Each	326.00	368.00	368.00
7.5.11	140 mm dia	Each	409.00	461.00	461.00
7.5.12	160 mm dia	Each	418.00	486.00	485.00
7.5.13	180 mm dia	Each	632.00	720.00	719.00
7.5.14	200 mm dia	Each	628.00	741.00	735.00
7.5.15	225 mm dia	Each	656.00	791.00	791.00
7.5.16	250 mm dia	Each	1052.00	1074.00	1221.00
7.5.17	280 mm dia	Each	980.00	1193.00	1193.00
7.5.18	315 mm dia	Each	1458.00	1789.00	1793.00
7.5.19	355 mm dia	Each	1994.00	2420.00	2411.00
7.5.20	400 mm dia	Each	2484.00	3019.00	3019.00
7.5.21	450 mm dia	Each	2935.00	3610.00	3601.00
7.5.22	500 mm dia	Each	3691.00	4537.00	4529.00
7.5.23	560 mm dia	Each	5223.00	6273.00	6279.00
7.5.24	630 mm dia	Each	4492.00	5820.00	5823.00
7.5.25	710 mm dia	Each	6845.00	8885.00	8924.00
7.6	Providing and laying Reducer 6 kg/sq.cm : confirming to IS specifications.		STEP I	STEP II	STEP III
7.6.1	20 mm dia	Each	-	-	-
7.6.2	25 mm dia	Each	56.00	-	-
7.6.3	32 mm dia	Each	62.00	62.00	-
7.6.4	40 mm dia	Each	69.00	69.00	74.00
7.6.5	50 mm dia	Each	85.00	88.00	89.00
7.6.6	63 mm dia	Each	107.00	108.00	110.00
7.6.7	75 mm dia	Each	147.00	150.00	157.00
7.6.8	90 mm dia	Each	160.00	167.00	175.00
7.6.9	110 mm dia	Each	157.00	192.00	189.00
7.6.10	125 mm dia	Each	171.00	221.00	212.00
7.6.11	140 mm dia	Each	201.00	245.00	250.00

S.No	Particulars of Items	Unit	Rate (in Rs.)		
7.6.12	160 mm dia	Each	257.00	315.00	302.00
7.6.13	180 mm dia	Each	299.00	395.00	370.00
7.6.14	200 mm dia	Each	342.00	457.00	446.00
7.6.15	225 mm dia	Each	436.00	583.00	556.00
7.6.16	250 mm dia	Each	508.00	567.00	671.00
7.6.17	280 mm dia	Each	663.00	704.00	709.00
7.6.18	315 mm dia	Each	869.00	849.00	916.00
7.6.19	355 mm dia	Each	1227.00	1176.00	1428.00
7.6.20	400 mm dia	Each	1299.00	1465.00	1538.00
7.6.21	450 mm dia	Each	1704.00	1918.00	5266.00
7.6.22	500 mm dia	Each	2073.00	2417.00	6268.00
7.6.23	560 mm dia	Each	2950.00	3100.00	12212.00
7.6.24	630 mm dia	Each	3480.00	3640.00	13082.00
7.6.25	710 mm dia	Each	4538.00	4672.00	16381.00
7.7	Providing and laying Reducer 8 kg/sq.cm : confirming to IS specifications.		STEP I	STEP II	STEP III
7.7.1	20 mm dia	Each	-	-	-
7.7.2	25 mm dia	Each	56.00	-	-
7.7.3	32 mm dia	Each	63.00	63.00	-
7.7.4	40 mm dia	Each	69.00	71.00	75.00
7.7.5	50 mm dia	Each	86.00	89.00	92.00
7.7.6	63 mm dia	Each	119.00	123.00	125.00
7.7.7	75 mm dia	Each	148.00	159.00	170.00
7.7.8	90 mm dia	Each	165.00	188.00	208.00
7.7.9	110 mm dia	Each	150.00	196.00	223.00
7.7.10	125 mm dia	Each	178.00	252.00	256.00
7.7.11	140 mm dia	Each	222.00	293.00	331.00
7.7.12	160 mm dia	Each	270.00	373.00	421.00
7.7.13	180 mm dia	Each	313.00	435.00	474.00
7.7.14	200 mm dia	Each	380.00	541.00	588.00
7.7.15	225 mm dia	Each	458.00	667.00	728.00
7.7.16	250 mm dia	Each	589.00	718.00	813.00
7.7.17	280 mm dia	Each	745.00	858.00	1004.00
7.7.18	315 mm dia	Each	1022.00	1145.00	1420.00
7.7.19	355 mm dia	Each	1209.00	1356.00	1850.00
7.7.20	400 mm dia	Each	1456.00	1798.00	2270.00
7.7.21	450 mm dia	Each	1887.00	2358.00	2593.00
7.7.22	500 mm dia	Each	2854.00	3266.00	3378.00
7.7.23	560 mm dia	Each	3094.00	3687.00	3785.00
7.7.24	630 mm dia	Each	3293.00	4014.00	4268.00

S.No	Particulars of Items	Unit	Rate (in Rs.)		
7.7.25	710 mm dia	Each	3568.00	4238.00	4552.00
7.8	Providing and laying Reducer 10 kg/sq.cm : confirming to IS specifications.		STEP I	STEP II	STEP III
7.8.1	20 mm dia	Each	-	-	-
7.8.2	25 mm dia	Each	62.00	-	-
7.8.3	32 mm dia	Each	69.00	69.00	-
7.8.4	40 mm dia	Each	76.00	77.00	83.00
7.8.5	50 mm dia	Each	92.00	94.00	95.00
7.8.6	63 mm dia	Each	114.00	118.00	124.00
7.8.7	75 mm dia	Each	153.00	156.00	162.00
7.8.8	90 mm dia	Each	175.00	180.00	183.00
7.8.9	110 mm dia	Each	182.00	204.00	189.00
7.8.10	125 mm dia	Each	197.00	225.00	218.00
7.8.11	140 mm dia	Each	206.00	248.00	257.00
7.8.12	160 mm dia	Each	271.00	324.00	311.00
7.8.13	180 mm dia	Each	316.00	406.00	381.00
7.8.14	200 mm dia	Each	362.00	470.00	461.00
7.8.15	225 mm dia	Each	484.00	601.00	572.00
7.8.16	250 mm dia	Each	543.00	582.00	696.00
7.8.17	280 mm dia	Each	738.00	737.00	737.00
7.8.18	315 mm dia	Each	924.00	990.00	1010.00
7.8.19	355 mm dia	Each	1261.00	1222.00	1541.00
7.8.20	400 mm dia	Each	1392.00	1535.00	1713.00
7.8.21	450 mm dia	Each	1878.00	2127.00	2114.00
7.8.22	500 mm dia	Each	2308.00	2498.00	2598.00
7.8.23	560 mm dia	Each	3061.00	3188.00	3161.00
7.8.24	630 mm dia	Each	3637.00	3784.00	3856.00
7.8.25	710 mm dia	Each	3854.00	3876.00	4012.00
7.9	Providing butt fusion welded joint/jointing by heating to the ends with the help of Teflon coated electric mirror/heater ends together etc. by thermosetting process to HDPE Pipe and specials. (6kg, 8kg, 10kg) (50mm & above fusion jointed & below 50mm mechanical jointed)	Unit			
7.9.1	20 mm dia	Each	65.00		
7.9.2	25 mm dia	Each	65.00		
7.9.3	32 mm dia	Each	72.00		
7.9.4	40 mm dia	Each	87.00		
7.9.5	50 mm dia	Each	76.00		
7.9.6	63 mm dia	Each	100.00		
7.9.7	75 mm dia	Each	126.00		
7.9.8	90 mm dia	Each	141.00		
7.9.9	110 mm dia	Each	154.00		
7.9.10	125 mm dia	Each	186.00		

S.No	Particulars of Items	Unit	Rate (in Rs.)		
7.9.11	140 mm dia	Each	197.00		
7.9.12	160 mm dia	Each	217.00		
7.9.13	180 mm dia	Each	229.00		
7.9.14	200 mm dia	Each	245.00		
7.9.15	225 mm dia	Each	271.00		
7.9.16	250 mm dia	Each	316.00		
7.9.17	280 mm dia	Each	340.00		
7.9.18	315 mm dia	Each	373.00		
7.9.19	355 mm dia	Each	417.00		
7.9.20	400 mm dia	Each	489.00		
7.9.21	450 mm dia	Each	652.00		
7.9.22	500 mm dia	Each	784.00		
7.9.23	560 mm dia	Each	958.00		
7.9.24	630 mm dia	Each	1086.00		
7.9.25	710 mm dia	Each	1244.00		
7.10	Providing and laying End Cap confirming to IS specifications.		6 Kg	8 Kg	10 Kg
7.10.1	20 mm dia	Each	51.00	53.00	53.00
7.10.2	25 mm dia	Each	52.00	53.00	55.00
7.10.3	32 mm dia	Each	53.00	55.00	57.00
7.10.4	40 mm dia	Each	56.00	57.00	60.00
7.10.5	50 mm dia	Each	67.00	74.00	76.00
7.10.6	63 mm dia	Each	91.00	93.00	97.00
7.10.7	75 mm dia	Each	116.00	122.00	126.00
7.10.8	90 mm dia	Each	132.00	135.00	141.00
7.10.9	110 mm dia	Each	112.00	132.00	135.00
7.10.10	125 mm dia	Each	159.00	214.00	255.00
7.10.11	140 mm dia	Each	222.00	252.00	259.00
7.10.12	160 mm dia	Each	259.00	358.00	372.00
7.10.13	180 mm dia	Each	361.00	422.00	441.00
7.10.14	200 mm dia	Each	424.00	499.00	523.00
7.10.15	225 mm dia	Each	507.00	515.00	672.00
7.10.16	250 mm dia	Each	671.00	764.00	798.00
7.10.17	280 mm dia	Each	811.00	876.00	787.00
7.10.18	315 mm dia	Each	1005.00	1104.00	1523.00
7.10.19	355 mm dia	Each	1293.00	1475.00	2660.00
7.10.20	400 mm dia	Each	1998.00	2224.00	3414.00
7.10.21	450 mm dia	Each	2794.00	2995.00	5597.00
7.10.22	500 mm dia	Each	4118.00	4369.00	6559.00
7.10.23	560 mm dia	Each	5758.00	6100.00	9605.00
7.10.24	630 mm dia	Each	8187.00	8986.00	11683.00
7.10.25	710 mm dia	Each	8432.00	9858.00	13546.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
	MDPE Pipes House Services Connection with necessary Electro Fusion & Compression fittings.		
7.11	Providing, Supplying and laying Blue MDPE (medium density polyethylene) pipes conforming to ISO 4427:1996 manufactured from virgin resin PE 80 Food grade compounded Raw Material having Blue Colour only with quality assurance certificate from quality agencies like CIPET (India) and other recognised agencies for usage in Drinking Water System. The cost shall include testing of all materials, Inspection charges, transportation upto site, transit insurance, loading, unloading, stacking etc. complete.		
7.11.1	PN 16 (SDR 9)		
7.11.1.1	20mm dia	Rmt	38.00
7.11.1.2	25mm dia	Rmt	51.00
7.11.1.3	32mm dia	Rmt	85.00
7.11.1.4	40mm dia	Rmt	108.00
7.11.1.5	50mm dia	Rmt	174.00
7.11.1.6	63mm dia	Rmt	255.00
7.11.1.7	75mm dia	Rmt	335.00
7.11.1.8	90mm dia	Rmt	486.00
7.11.1.9	110mm dia	Rmt	720.00
7.11.2	PN 12.5 (SDR 11)		
7.11.2.1	25mm dia	Rmt	51.00
7.11.2.2	32mm dia	Rmt	83.00
7.11.2.3	40mm dia	Rmt	104.00
7.11.2.4	50mm dia	Rmt	149.00
7.11.2.5	63mm dia	Rmt	203.00
7.11.2.6	75mm dia	Rmt	281.00
7.11.2.7	90mm dia	Rmt	404.00
7.11.2.8	110mm dia	Rmt	599.00
7.11.3	PN 10 (SDR 13.6)		
7.11.3.1	63mm dia	Rmt	173.00
7.11.3.2	75mm dia	Rmt	242.00
7.11.3.3	90mm dia	Rmt	353.00
7.11.3.4	110mm dia	Rmt	515.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
7.12	Providing, Supplying and fixing of Electro Fusion Tapping Ferrule (Branch Tapping Saddle) female BSP Threaded with SS 304 insert fittings in accordance with BS EN 12201 : Part-3 suitable for drinking water with in black/blue colour manufactured from compounded PE80/PE 100 virgin polymer and compatible with PE80/PE100 pipes, in pressure rating SDR 11 with min PN 12.5 rated for water application. The cost such as testing, inspection charges, transportation upto site, transit insurance, loading, unloading, stacking etc. all complete.		
	Electo Fusion Tapping Ferrule Saddle		
7.12.1	63x15mm	Each	1117.00
7.12.2	63x20mm	Each	1123.00
7.12.3	63x25mm	Each	1125.00
7.12.4	75x15mm	Each	1127.00
7.12.5	75x20mm	Each	1130.00
7.12.6	75x25mm	Each	1132.00
7.12.7	90x15mm	Each	1132.00
7.12.8	90x20mm	Each	1135.00
7.12.9	90x25mm	Each	1139.00
7.12.10	90x32mm	Each	1437.00
7.12.11	90x40mm	Each	1460.00
7.12.12	90x50 mm	Each	1474.00
7.12.13	110x15mm	Each	1129.00
7.12.14	110x20mm	Each	1137.00
7.12.15	110x25mm	Each	1139.00
7.12.16	110x32mm	Each	1463.00
7.12.17	110x40mm	Each	1466.00
7.12.18	110x50mm	Each	1478.00
7.12.19	160x15mm	Each	1129.00
7.12.20	160x20mm	Each	1136.00
7.12.21	160x25mm	Each	1135.00
7.12.22	160x32mm	Each	1610.00
7.12.23	160x40mm	Each	1612.00
7.12.24	160x50mm	Each	1613.00
7.12.25	200x15mm	Each	1602.00
7.12.26	200x20mm	Each	1609.00
7.12.27	200x25mm	Each	1609.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
7.12.28	200x32mm	Each	2309.00
7.12.29	200x40mm	Each	2320.00
7.12.30	200x50mm	Each	2320.00
7.12.31	250x15mm	Each	1605.00
7.12.32	250x20mm	Each	1603.00
7.12.33	250x25mm	Each	1609.00
7.12.34	250x32mm	Each	2288.00
7.12.35	250x40mm	Each	2309.00
7.12.36	250x50mm	Each	2316.00
7.12.37	315x15mm	Each	1835.00
7.12.38	315x20mm	Each	1876.00
7.12.39	315x25mm	Each	1915.00
7.12.40	315x32mm	Each	2561.00
7.12.41	315x40mm	Each	2468.00
7.12.42	315x50mm	Each	2470.00
7.13	Providing, Supplying and fixing of Compression fittings, PN16 rated in conformation to ISO:14236-2000 and shall be tested as per ISO:3459, ISO : 3501 & ISO: 3503, suitable for drinking water & approved by certified agencies, in food grade polypropylene and shall be inclusive of all cost of inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.		
	Compression Fittings		
7.13.1	Metal inserted Compression Female Threaded Adaptor with SS 304 Material		
7.13.1.1	20x15mm	Each	193.00
7.13.1.2	25x20mm	Each	253.00
7.13.1.3	32x25mm	Each	339.00
7.13.1.4	40x32mm	Each	582.00
7.13.1.5	50x40mm	Each	751.00
7.13.1.6	63x50mm	Each	1026.00
7.13.2	Metal inserted Compression Male Threaded Adaptor with SS 304 Material		
7.13.2.1	20x15mm	Each	193.00
7.13.2.2	25x20mm	Each	251.00
7.13.2.3	32x25mm	Each	340.00
7.13.2.4	40x32mm	Each	582.00
7.13.2.5	50x40mm	Each	753.00
7.13.2.6	63x50mm	Each	1025.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
7.13.3	Compression 90 Deg. Elbow threaded male off take in Metal		
7.13.3.1	20x15mm	Each	207.00
7.13.3.2	25x20mm	Each	273.00
7.13.3.3	32x25mm	Each	377.00
7.13.3.4	40x32mm	Each	1313.00
7.13.3.5	50x40mm	Each	1708.00
7.13.3.6	63x50mm	Each	2492.00
7.13.4	Compression 90 Deg. Elbow threaded Female off take in Metal		
7.13.4.1	20x15mm	Each	206.00
7.13.4.2	25x20mm	Each	272.00
7.13.4.3	32x25mm	Each	375.00
7.13.4.4	40x32mm	Each	1309.00
7.13.4.5	50x40mm	Each	1709.00
7.13.4.6	63x50mm	Each	2500.00
7.13.5	Compression 90 Deg. Elbow		
7.13.5.1	20mm	Each	126.00
7.13.5.2	25mm	Each	171.00
7.13.5.3	32mm	Each	223.00
7.13.5.4	40mm	Each	448.00
7.13.5.5	50mm	Each	631.00
7.13.5.6	63mm	Each	856.00
7.14	Providing, Supplying and fixing of PVC Ball Valves in PN16 rating with one end compression using Blue colour compression nut in polypropylene material & other end with female threads conforming to ISO:4422-4, certified from certified agencies suitable for food products & drinking water, female threads in accordance with ISO:7/BS:21/ IS: 554 and shall be inclusive of all cost of testing of all materials, inspection charges, transportation upto site, transit insurance, loading, unloading, stacking etc. complete.		
	PVC Ball Valve with Compression & Female Threads		
7.14.1	20x15mm	Each	199.00
7.14.2	25x20mm	Each	260.00
7.14.3	32x25mm	Each	292.00
7.14.4	40x32mm	Each	628.00
7.14.5	50x40mm	Each	843.00
7.14.6	63x50mm	Each	1419.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
7.15	Providing, Supplying and fixing of Clamp Saddle (DI Strap Saddle) for House Service connections from metal pipe Water Distribution mains shall be of fastened strap type with threaded outlet for service connection. Clamp Saddle shall be suitable for nominal size of distribution mains pipe line. The strap shall be elastomer coated (insulated) type for firm grip on pipe as well as to protect the coating on the pipe and to insulate the unidentical metals. The saddle shall be single strap type upto pipe sizes of NB 600 and service outlet 15mm, 20mm & 25mm. Fasteners shall be of threaded nut-bolt- washer type. The sealing between the saddle and mains shall be obtained by using a profiled elastomer seal matching to the curvature of the pipe. The seal shall be of elastomer type, suitable for all potable water application. The material of construction of the body, straps, fasteners etc, shall be of non corrosive material such as engineering plastic (PE/PP) or stainless steel or a combination of both.		
7.15.1	80 NB x 15mm, 20mm, 25mm	Each	1242.00
7.15.2	100 NB x 15mm, 20mm, 25mm	Each	1366.00
7.15.3	150 NB x 15mm, 20mm, 25mm	Each	1612.00
7.15.4	200 NB x 15mm, 20mm, 25mm	Each	1871.00
7.15.5	250 NB x 15mm, 20mm, 25mm	Each	2127.00
7.15.6	300 NB x 15mm, 20mm, 25mm	Each	2377.00
7.16	Providing, Supplying and fixing of Electro Fusion Fittings in accordance with BS EN 12201 : Part-3 suitable for drinking water with in black/blue colour manufactured from compounded PE80/PE100 virgin polymer and compatible with PE80/PE100 pipes, in pressure rated SDR11 with min PN 12.5 rated for water application. The cost such as testing, inspection charges, transportation upto site, transit insurance, loading, unloading, stacking etc. all complete.		
7.16.1	Electro Fusion Coupler		
7.16.1.1	20mm	Each	125.00
7.16.1.2	25mm	Each	125.00
7.16.1.3	32mm	Each	126.00
7.16.1.4	40mm	Each	231.00
7.16.1.5	50mm	Each	287.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
7.16.1.6	63mm	Each	308.00
7.16.1.7	75mm	Each	552.00
7.16.1.8	90mm	Each	594.00
7.16.1.9	110mm	Each	845.00
7.16.1.10	125mm	Each	865.00
7.16.1.11	140mm	Each	1844.00
7.16.1.12	160mm	Each	2025.00
7.16.1.13	180mm	Each	3020.00
7.16.1.14	200mm	Each	3940.00
7.16.1.15	225mm	Each	4669.00
7.16.1.16	250mm	Each	5701.00
7.16.1.17	280mm	Each	11398.00
7.16.1.18	315mm	Each	11481.00
7.16.2	Electro Fusion Equal Tee		
7.16.2.1	20mm	Each	303.00
7.16.2.2	25mm	Each	310.00
7.16.2.3	32mm	Each	313.00
7.16.2.4	40mm	Each	1060.00
7.16.2.5	50mm	Each	1182.00
7.16.2.6	63mm	Each	1310.00
7.16.2.7	75mm	Each	1750.00
7.16.2.8	90mm	Each	2172.00
7.16.2.9	110mm	Each	2622.00
7.16.2.10	125mm	Each	3236.00
7.16.2.11	140mm	Each	7325.00
7.16.2.12	160mm	Each	7370.00
7.16.2.13	180mm	Each	10751.00
7.16.2.14	200mm	Each	13782.00
7.16.2.15	225mm	Each	16300.00
7.16.2.16	250mm	Each	23742.00
7.16.2.17	280mm	Each	26259.00
7.16.2.18	315mm	Each	28710.00
7.16.3	Electro Fusion Elbow 90 Deg.		
7.16.3.1	20mm	Each	236.00
7.16.3.2	25mm	Each	237.00
7.16.3.3	32mm	Each	238.00
7.16.3.4	40mm	Each	623.00
7.16.3.5	50mm	Each	625.00
7.16.3.6	63mm	Each	627.00
7.16.3.7	75mm	Each	1373.00
7.16.3.8	90mm	Each	1877.00
7.16.3.9	110mm	Each	2492.00
7.16.3.10	125mm	Each	2997.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
7.16.3.11	140mm	Each	6385.00
7.16.3.12	160mm	Each	8252.00
7.16.3.13	180mm	Each	10647.00
7.16.3.14	200mm	Each	20001.00
7.16.3.15	225mm	Each	22495.00
7.16.3.16	250mm	Each	24989.00
7.16.3.17	280mm	Each	27520.00
7.16.3.18	315mm	Each	31176.00
7.16.4	Electro Fusion Reducer		
7.16.4.1	25x20mm	Each	248.00
7.16.4.2	32x20mm	Each	250.00
7.16.4.3	32x25mm	Each	251.00
7.16.4.4	40x32mm	Each	840.00
7.16.4.5	50x32mm	Each	1052.00
7.16.4.6	50x40mm	Each	1160.00
7.16.4.7	63x32mm	Each	1239.00
7.16.4.8	63x40mm	Each	1255.00
7.16.4.9	63x50mm	Each	1452.00
7.16.4.10	90x63mm	Each	2049.00
7.16.4.11	90x75mm	Each	2615.00
7.16.4.12	110x75mm	Each	3309.00
7.16.4.13	110x90mm	Each	3760.00
7.16.4.14	125x90mm	Each	4769.00
7.16.4.15	125x110mm	Each	4771.00
7.16.4.16	140x90mm	Each	5241.00
7.16.4.17	140x110mm	Each	4778.00
7.16.4.18	140x125mm	Each	4793.00
7.16.4.19	160x110mm	Each	6153.00
7.16.4.20	160x125mm	Each	6246.00
7.16.4.21	160x140mm	Each	6271.00
7.16.4.22	180x125mm	Each	6991.00
7.16.4.23	180x140mm	Each	7068.00
7.16.4.24	180x160mm	Each	7098.00
7.16.4.25	200x160mm	Each	8447.00
7.16.4.26	200x180mm	Each	8414.00
7.16.4.27	225x160mm	Each	10244.00
7.16.4.28	225x180mm	Each	10231.00
7.16.4.29	225x200mm	Each	10279.00
7.16.4.30	250x160mm	Each	12527.00
7.16.4.31	250x200mm	Each	12542.00
7.16.4.32	250x225mm	Each	12565.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
7.16.5	Electro Fusion End Cap		
7.16.5.1	20mm	Each	173.00
7.16.5.2	25mm	Each	177.00
7.16.5.3	32mm	Each	176.00
7.16.5.4	40mm	Each	336.00
7.16.5.5	50mm	Each	458.00
7.16.5.6	63mm	Each	662.00
7.16.5.7	75mm	Each	989.00
7.16.5.8	90mm	Each	1258.00
7.16.5.9	110mm	Each	1596.00
7.16.5.10	125mm	Each	1940.00
7.16.5.11	140mm	Each	2845.00
7.16.5.12	160mm	Each	4099.00
7.16.5.13	180mm	Each	5042.00
7.16.5.14	200mm	Each	5929.00
7.16.5.15	225mm	Each	9811.00
7.16.5.16	250mm	Each	11415.00
7.16.5.17	280mm	Each	12554.00
7.16.5.18	315mm	Each	13624.00
7.16.6	Spigot Long Neck Pipe End (Stub End) for Electro Fusion Joint		
7.16.6.1	63mm	Each	448.00
7.16.6.2	75mm	Each	498.00
7.16.6.3	90mm	Each	633.00
7.16.6.4	110mm	Each	965.00
7.16.6.5	125mm	Each	1517.00
7.16.6.6	140mm	Each	1728.00
7.16.6.7	160mm	Each	2473.00
7.16.6.8	180mm	Each	3321.00
7.16.6.9	200mm	Each	3908.00
7.16.6.10	225mm	Each	4681.00
7.16.6.11	250mm	Each	5372.00
7.16.6.12	280mm	Each	6030.00
7.16.6.13	315mm	Each	7855.00

CHAPTER - 8

M.S. Pipes & Specials

- 1 Scope
 - 1.1 This Specification covers the requirements for manufacturing, supplying, laying, jointing, testing at works, site of Electrically Welded Steel pipes, internally lined with cement concrete and externally coated with cement mortar, used for water supply mains.
- 2 Applicable Codes
 - IS: 3589 Seamless/Electrically Welded Steel Pipes for Water, Gas, Sewage Specification.
 - IS: 5822 Code of Practice for laying of Electrically Welded Steel Pipes for Water Supply.
 - IS : 7322 Specification for Specials for Steel Cylinder Reinforced Concrete Pipes
 - IS: 432 Mild Steel and Medium Tensile Bars Reinforcement Part I
 - IS: 432 Part II Specifications for Mild Steel and Medium Tensile Bars and Hard Drawn Steel Wire (Third Revision)
 - IS: 2328 Flattening Test for Seamless Pipes
 - IS: 12269 Specification for 53 Grade Ordinary Portland Cement (OPC)

 - IS: 6452 Specification for High Alumina Cement for Structural Use (Ist Revision)

 - IS: 8112 Specification for Curing of High Strength OPC
 - IS: 8041 Specifications for Curing of Rapid Hardening Cement
 - IS: 269 Specification for Ordinary Portland Cement (OPC)
 - IS: 455 Specification for Portland Slag Cement
 - IS: 1489 Specification for Portland Pozzolana Cement
 - IS: 8043 Specification for Hydrophobic Portland Cement
 - IS: 3600 Part I Methods of Testing Fusion Welded Joints and Weld Metal in Steel :
- 2.1 Other I.S. Codes not Specifically mentioned here but pertaining to the use of Electrically Welded Steel pipes shall form part of these Specifications.
- 3 Dimension & Mass Per Meter Run of Pipes
 - 3.1 The preferred outside Diameter and thickness of the pipes shall be as per the table -5, of IS : 3589 : 2001.

3.2 Mass per meter run of the pipes can be worked out by the formula as under.

$$M = (D - T) \times T \times 0.0246615$$

M = mass of the pipe kg/metre,

D = nominal outside diameter of the tube in mm, and

T = Nominal thickness of the tube in mm

3.3 Tolerances

The tolerances of mass per cart load of 10 tonnes or above shall be ± 7.5 percent on the nominal theoretical mass of the tubes.

4 Length : The pipes shall be manufactured in lengths of 5m, unless otherwise specified.

5 Welding : For manufacturing of the site pipes, the welding & testing should comply with IS: 816.

6 Fabrication of specials : Specials such as bends, tapers, tees shall Conform to IS: 7322, Specials shall be fabricated by cutting plates of the specified thickness to the required shape obtained by developing the form of specials on ground. Stiffeners shall be provided wherever necessary. Abutting profiles shall be obtained using templates which guide the cutting torches as to obtained a uniform cut. No hand cutting shall be permitted. Specifications for the using and testing of the plates, electrodes, welding, cleaning etc., shall be the same as for the straight pipes.

7 **Measurement:**

The net length of pipes as laid or fixed should be measured in running meters correct to a cm. Specials should be excluded and enumerated and paid for separately. The portion of the pipe within the collar at the joints shall not be included in the length of pipe work.

8 **Rates**

The rates include charges for all tools & plants, chain pulley blocks, other appliances etc. required for lifting and laying the pipes and specials in positions as per approved drawing.

The rates include provision and use of all coverings etc. to protect the works from inclement weather etc. and from damages from fall of materials, and other causes.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 8 - M.S. Pipes & Specials

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
	M.S.PIPES		
8.1	Providing, Supplying & laying of following M.S. pipes as per IS specifications with inside & outside epoxy coating as per relevant IS code, duly tested for usage in Drinking water inclusive of all materials, inspection charges, transit insurance, loading/unloading FOR site unloading & stacking etc. complete as per direction of Engineer-in-Charge.		
8.1.1	Dia. of pipe 219.10 mm (O.D) Thickness of pipe :		
8.1.1.1	4.80 mm	RM	1560.00
8.1.1.2	5.60 mm	RM	1812.00
8.1.1.3	6.40 mm	RM	2062.00
8.1.1.4	7.00 mm	RM	2249.00
8.1.1.5	7.90 mm	RM	2527.00
8.1.1.6	8.20 mm	RM	2619.00
8.1.1.7	8.70 mm	RM	2771.00
8.1.1.8	9.50 mm	RM	3015.00
8.1.2	Dia. of pipe 273.10 mm (O.D) Thickness of pipe :		
8.1.2.1	4.80 mm	RM	1956.00
8.1.2.2	5.60 mm	RM	2273.00
8.1.2.3	6.40 mm	RM	2589.00
8.1.2.4	7.20 mm	RM	2902.00
8.1.2.5	7.80 mm	RM	3136.00
8.1.2.6	8.70 mm	RM	3486.00
8.1.2.7	9.30 mm	RM	3717.00
8.1.3	Dia. of pipe 323.9 mm (O.D) Thickness of pipe :		
8.1.3.1	5.60 mm	RM	2703.00
8.1.3.2	6.40 mm	RM	3080.00
8.1.3.3	7.10 mm	RM	3408.00
8.1.3.4	7.90 mm	RM	3782.00
8.1.3.5	8.40 mm	RM	4014.00
8.1.3.6	8.70 mm	RM	4153.00
8.1.3.7	9.50 mm	RM	4523.00
8.1.4	Dia. of pipe 355.7 mm (O.D) Thickness of pipe :		
8.1.4.1	5.60 mm	RM	2976.00
8.1.4.2	6.40 mm	RM	3391.00
8.1.4.3	7.10 mm	RM	3754.00
8.1.4.4	7.90 mm	RM	4165.00
8.1.4.5	8.70 mm	RM	4575.00
8.1.4.6	9.50 mm	RM	4983.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.1.5	Dia. of pipe 406.0 mm (O.D) Thickness of pipe :		
8.1.5.1	5.60 mm	RM	3407.00
8.1.5.2	6.40 mm	RM	3883.00
8.1.5.3	7.10 mm	RM	4298.00
8.1.5.4	7.90 mm	RM	4771.00
8.1.5.5	8.70 mm	RM	5241.00
8.1.5.6	9.50 mm	RM	5710.00
8.1.5.7	10.00 mm	RM	6002.00
8.1.6	Dia. of pipe 457.0 mm (O.D) Thickness of pipe :		
8.1.6.1	5.60 mm	RM	3842.00
8.1.6.2	6.40 mm	RM	4380.00
8.1.6.3	7.10 mm	RM	4850.00
8.1.6.4	7.90 mm	RM	5384.00
8.1.6.5	8.70 mm	RM	5916.00
8.1.6.6	9.50 mm	RM	6446.00
8.1.6.7	10.00 mm	RM	6777.00
8.1.7	Dia. of pipe 508.0 mm (O.D) Thickness of pipe :		
8.1.7.1	5.60 mm	RM	4274.00
8.1.7.2	6.40 mm	RM	4873.00
8.1.7.3	7.10 mm	RM	5397.00
8.1.7.4	7.90 mm	RM	5992.00
8.1.7.5	8.70 mm	RM	6587.00
8.1.7.6	9.50 mm	RM	7178.00
8.1.7.7	10.00 mm	RM	7547.00
8.1.8	Dia. of pipe 559.0 mm (O.D) Thickness of pipe :		
8.1.8.1	5.60 mm	RM	4717.00
8.1.8.2	6.40 mm	RM	5378.00
8.1.8.3	7.10 mm	RM	5955.00
8.1.8.4	7.90 mm	RM	6613.00
8.1.8.5	8.70 mm	RM	7268.00
8.1.8.6	9.50 mm	RM	7922.00
8.1.8.7	10.00 mm	RM	8329.00
8.1.9	Dia. of pipe 610.0 mm (O.D) Thickness of pipe :		
8.1.9.1	5.60 mm	RM	5148.00
8.1.9.2	6.40 mm	RM	5871.00
8.1.9.3	7.10 mm	RM	6502.00
8.1.9.4	7.90 mm	RM	7221.00
8.1.9.5	8.70 mm	RM	7938.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.1.9.6	9.50 mm	RM	8654.00
8.1.9.7	10.00 mm	RM	9100.00
8.1.9.8	12.00 mm	RM	10877.00
8.1.10	Dia. of pipe 660.0 mm (O.D) Thickness of pipe :		
8.1.10.1	5.60 mm	RM	5572.00
8.1.10.2	6.40 mm	RM	6355.00
8.1.10.3	7.10 mm	RM	7038.00
8.1.10.4	7.90 mm	RM	7818.00
8.1.10.5	8.70 mm	RM	8596.00
8.1.10.6	9.50 mm	RM	9372.00
8.1.10.7	10.00 mm	RM	9856.00
8.1.11	Dia. of pipe 711.0 mm (O.D) Thickness of pipe :		
8.1.11.1	5.60 mm	RM	6003.00
8.1.11.2	6.40 mm	RM	6848.00
8.1.11.3	7.10 mm	RM	7586.00
8.1.11.4	7.90 mm	RM	8427.00
8.1.11.5	8.70 mm	RM	9266.00
8.1.11.6	9.50 mm	RM	10104.00
8.1.11.7	10.00 mm	RM	10626.00
8.1.11.8	12.00 mm	RM	12708.00
8.1.12	Dia. of pipe 762.00. mm (O. D.) Thickness of pipe :		
8.1.12.1	5.60 mm	RM	6434.00
8.1.12.2	6.40 mm	RM	7341.00
8.1.12.3	7.10 mm	RM	8133.00
8.1.12.4	7.90 mm	RM	9036.00
8.1.12.5	8.70 mm	RM	9937.00
8.1.12.6	9.50 mm	RM	10836.00
8.1.12.7	10.00 mm	RM	11397.00
8.1.13	Dia. of pipe 813.00. mm (O.D.) Thickness of pipe :		
8.1.13.1	5.60 mm	RM	6866.00
8.1.13.2	6.40 mm	RM	7834.00
8.1.13.3	7.10 mm	RM	8680.00
8.1.13.4	7.90 mm	RM	9644.00
8.1.13.5	8.70 mm	RM	10607.00
8.1.13.6	9.50 mm	RM	11568.00
8.1.13.7	10.00 mm	RM	12167.00
8.1.13.8	12.00 mm	RM	14558.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.1.14	Dia. of pipe 864.00. mm (O. D.) Thickness of pipe :		
8.1.14.1	5.60 mm	RM	7314.00
8.1.14.2	6.40 mm	RM	8344.00
8.1.14.3	7.10 mm	RM	9244.00
8.1.14.4	7.90 mm	RM	10270.00
8.1.14.5	8.70 mm	RM	11295.00
8.1.14.6	9.50 mm	RM	12317.00
8.1.14.7	10.00 mm	RM	12955.00
8.1.15	Dia. of pipe 914.00 mm (O. D.) Thickness of pipe :		
8.1.15.1	5.60 mm	RM	7737.00
8.1.15.2	6.40 mm	RM	8828.00
8.1.15.3	7.10 mm	RM	9781.00
8.1.15.4	7.90 mm	RM	10867.00
8.1.15.5	8.70 mm	RM	11952.00
8.1.15.6	9.50 mm	RM	13035.00
8.1.15.7	10.00 mm	RM	13711.00
8.1.16	Dia. of pipe 965.00 mm (O. D.) Thickness of pipe :		
8.1.16.1	5.60 mm	RM	8186.00
8.1.16.2	6.40 mm	RM	9338.00
8.1.16.3	7.10 mm	RM	10345.00
8.1.16.4	7.90 mm	RM	11493.00
8.1.16.5	8.70 mm	RM	12639.00
8.1.16.6	9.50 mm	RM	13784.00
8.1.16.7	10.00 mm	RM	14498.00
8.1.17	Dia. of pipe 1016.00 mm (O. D.) Thickness of pipe :		
8.1.17.1	5.60 mm	RM	8617.00
8.1.17.2	6.40 mm	RM	9831.00
8.1.17.3	7.10 mm	RM	10892.00
8.1.17.4	7.90 mm	RM	12101.00
8.1.17.5	8.70 mm	RM	13310.00
8.1.17.6	9.50 mm	RM	14516.00
8.1.17.7	10.00 mm	RM	15268.00
8.1.17.8	12.00 mm	RM	18273.00
8.1.18	Dia. of pipe 1067.00 mm (O. D.) Thickness of pipe :		
8.1.18.1	5.60 mm	RM	9049.00
8.1.18.2	6.40 mm	RM	10324.00
8.1.18.3	7.10 mm	RM	11438.00
8.1.18.4	7.90 mm	RM	12710.00
8.1.18.5	8.70 mm	RM	13980.00
8.1.18.6	9.50 mm	RM	15248.00
8.1.18.7	10.00 mm	RM	16039.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.1.19	Dia. of pipe 1118.00. mm (O. D.) Thickness of pipe :		
8.1.19.1	5.60 mm	RM	9481.00
8.1.19.2	6.40 mm	RM	10818.00
8.1.19.3	7.10 mm	RM	11986.00
8.1.19.4	7.90 mm	RM	13319.00
8.1.19.5	8.70 mm	RM	14651.00
8.1.19.6	9.50 mm	RM	15980.00
8.1.19.7	10.00 mm	RM	16810.00
8.1.20	Dia. of pipe 1168.00. mm (O. D.) Thickness of pipe :		
8.1.20.1	5.60 mm	RM	9904.00
8.1.20.2	6.40 mm	RM	11301.00
8.1.20.3	7.10 mm	RM	12522.00
8.1.20.4	7.90 mm	RM	13916.00
8.1.20.5	8.70 mm	RM	15308.00
8.1.20.6	9.50 mm	RM	16698.00
8.1.20.7	10.00 mm	RM	17566.00
8.1.21	Dia. of pipe 1219.00. mm (O. D.) Thickness of pipe :		
8.1.21.1	6.40 mm	RM	11794.00
8.1.21.2	7.10 mm	RM	13069.00
8.1.21.3	7.90 mm	RM	14525.00
8.1.21.4	8.70 mm	RM	15979.00
8.1.21.5	9.50 mm	RM	17430.00
8.1.21.6	10.00 mm	RM	18336.00
8.1.21.7	12.00 mm	RM	21954.00
8.1.22	Dia. of pipe 1296.00. mm (O. D.) Thickness of pipe :		
8.1.22.1	9.50 mm	RM	18561.00
8.1.22.2	9.98 mm	RM	19486.00
8.1.22.3	10.00 mm	RM	19525.00
8.1.23	Dia. of pipe 1321.00. mm (O. D.) Thickness of pipe :		
8.1.23.1	6.40 mm	RM	12806.00
8.1.23.2	7.10 mm	RM	14189.00
8.1.23.3	7.90 mm	RM	15768.00
8.1.23.4	8.70 mm	RM	17344.00
8.1.23.5	9.50 mm	RM	18919.00
8.1.23.6	10.00 mm	RM	19903.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.1.24	Dia. of pipe 1422.00. mm (O. D.) Thickness of pipe :		
8.1.24.1	7.10 mm	RM	15272.00
8.1.24.2	7.90 mm	RM	16973.00
8.1.24.3	8.70 mm	RM	18672.00
8.1.24.4	9.50 mm	RM	20369.00
8.1.24.5	10.00 mm	RM	21429.00
8.1.24.6	12.00 mm	RM	25660.00
8.1.25	Dia. of pipe 1473.00. mm (O. D.) Thickness of pipe :		
8.1.25.1	9.50 mm	RM	21101.00
8.1.25.2	9.98 mm	RM	22156.00
8.1.26	Dia. of pipe 1524.00. mm (O. D.) Thickness of pipe :		
8.1.26.1	7.10 mm	RM	16367.00
8.1.26.2	7.90 mm	RM	18191.00
8.1.26.3	8.70 mm	RM	20013.00
8.1.26.4	9.50 mm	RM	21833.00
8.1.26.5	10.00 mm	RM	22970.00
8.1.26.6	11.90 mm	RM	27283.00
8.1.26.7	12.00 mm	RM	27509.00
8.1.27	Dia. of pipe 1550.00. mm (O. D.) Thickness of pipe :		
8.1.27.1	10.00 mm	RM	23363.00
8.1.27.2	11.00 mm	RM	25673.00
8.1.28	Dia. of pipe 1576.00. mm (O. D.) Thickness of pipe :		
8.1.28.1	9.50 mm	RM	22580.00
8.1.28.2	10.00 mm	RM	23136.00
8.1.29	Dia. of pipe 1626.00. mm (O. D.) Thickness of pipe :		
8.1.29.1	7.10 mm	RM	17461.00
8.1.29.2	7.90 mm	RM	19409.00
8.1.29.3	8.70 mm	RM	21354.00
8.1.29.4	9.50 mm	RM	23298.00
8.1.29.5	10.00 mm	RM	24511.00
8.1.29.6	12.00 mm	RM	29359.00
8.1.30	Dia. of pipe 1650.00. mm (O. D.) Thickness of pipe :		
8.1.30.1	7.90 mm	RM	19695.00
8.1.30.2	8.70 mm	RM	21670.00
8.1.30.3	9.50 mm	RM	23642.00
8.1.30.4	10.00 mm	RM	24874.00
8.1.30.5	12.00 mm	RM	29794.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.1.31	Dia. of pipe 1700.00. mm (O. D.) Thickness of pipe :		
8.1.31.1	7.90 mm	RM	20292.00
8.1.31.2	8.70 mm	RM	22327.00
8.1.31.3	9.50 mm	RM	24360.00
8.1.31.4	10.00 mm	RM	25630.00
8.1.31.5	12.00 mm	RM	30700.00
8.1.32	Dia. of pipe 1750.00. mm (O. D.) Thickness of pipe :		
8.1.32.1	7.90 mm	RM	20889.00
8.1.32.2	8.70 mm	RM	22984.00
8.1.32.3	9.50 mm	RM	25078.00
8.1.32.4	10.00 mm	RM	26385.00
8.1.32.5	12.00 mm	RM	31607.00
8.1.33	Dia. of pipe 1800.00. mm (O. D.) Thickness of pipe :		
8.1.33.1	7.90 mm	RM	21486.00
8.1.33.2	8.70 mm	RM	23641.00
8.1.33.3	9.50 mm	RM	25796.00
8.1.33.4	10.00 mm	RM	27141.00
8.1.33.5	12.00 mm	RM	32514.00
<i>Fabrication of M.S. Pipes and Specials</i>			
8.2	Fabrication of M.S. pipes & specials as per IS specifications with inside & outside epoxy coating as per relevant IS code, duly tested for usage in Drinking water inclusive of all materials, inspection charges, transit insurance, loading/unloading, FOR site, & stacking etc. complete as for direction of Engineer-in-Charge.		
8.2.1	Fabricating pipes from steel plates (all thickness)		
8.2.1.1	5 to 8 mm	MT	7950.00
8.2.1.2	8 to 12 mm	MT	5385.00
8.2.2	Fabricating one piece cant (shorter than one strake length) from the steel plates complete.		
8.2.2.1	5 to 8 mm	MT	7950.00
8.2.2.2	8 to 12 mm	MT	5385.00
9.2.3	Fabricating composite bends from steel plates		
9.2.3.1	5 to 8 mm	MT	7950.00
9.2.3.2	8 to 12 mm	MT	5385.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.3	Fabricating tapers from the steel plates	MT	7950.00
8.4	Fabricating specials and fixtures		
8.4.1	Saddle pieces, loose stiffener rings, pressure type blank flanges, ladders, platforms, and any other minor fixtures. The rate to include cutting, bending, tack welding, etc.complete.	MT	7950.00
8.4.2	Blast cleaning the surface of the old or new pipeline internally to remove all rust etc. complete , including providing sand, machinery, labour, cutting of pipes at required places and rewelding the same etc. complete as directed by Engineer-in-charge (Pipe pieces if required for rewelding of old pipeline shall be paid separately)	sqm.	124.00
8.4.3	Blast cleaning of old or new pipeline surface internally with mechanical cleaning machine having steel scraper blades with required passes including removing all rust, scaling etc. complete , including cutting of pipes at required places and rewelding the same including cost of all material and labour etc. complete as directed by Engineer-in-charge (Pipe pieces if required for rewelding of old pipeline shall be paid separately)	sqm.	124.00
8.4.4	Blast Cleaning of old pipeline internally by using swabbing method by passing polyurethane foam "Pig" with required hydraulic pressure, cutting of pipes of required places, rewelding the same including cost of all materials and labour, etc. complete. (Pipe pieces if required for rewelding of old pipeline shall be paid separately).	Sqm	146.00
8.4.5	Blast cleaning the surface of the old or new pipeline externally to remove all rust etc. complete , including providing sand, machinery etc. as directed by Engineer-in-charge	Sqm	146.00
8.4.6	Providing and applying primer and one coat of red oxide of iron paint internally to blast cleaned surface of the pipes.	sqm	40.00
8.4.7	Providing and applying primer and one coat of red oxide of iron paint internally including cleaning the surface of the pipes with steel scrappers, wire brushes, and metal cleaning solution etc.	sqm	67.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.5	Providing and applying primer and one coat of red oxide of iron paint, externally, to blast cleaned surface of the pipes etc. complete	Sqm	44.00
8.6	Providing and applying primer and one coat of red oxide of iron paint, externally, including cleaning the surface of the pipes with steel scrappers, wire brushes and metal cleaning solution etc.	Sqm	96.00
8.7	Providing and applying covering coat of grey graphite of approved quality including dusting the surface etc complete.	Sqm	49.00
8.8	Providing and applying one coat of zinc rich epoxy primer to the internal surface of pipeline at site.	Sqm	104.00
8.9	Providing and applying primer first coat of interol 49W emaline 05/58 pipe coat or any other equivalent approved paint to the internal surface of pipeline at site.	Sqm	80.00
8.9.1	Second Coat	Sqm	65.00
8.9.2	Third Coat	Sqm	64.00
8.10	Providing and applying 30mm thick 1:3 cement mortar coating outside face of MS pipe along with fixing of 100 x 3 mm wire mesh	sqm	437.00
8.11	Providing and applying inside 20mm thick 1:2 cement mortar on inside face of MS pipe as per IS 3589	sqm	320.00
Laying of M.S. Pipes and Specials			
8.12	Labour Only for lowering & laying of M.S. Pipes on pedestals or chairs upon prepared formation including all site arrangements complete.		
8.12.1	5 mm to 8 mm thick.		
8.12.1.1	Up to 250 mm. dia.	RM	235.00
8.12.1.2	Above 250 mm.Upto 500 mm. dia.	RM	270.00
8.12.1.3	Above 500 mm.Upto 750 mm. dia.	RM	352.00
8.12.1.4	Above 750 mm.Upto 1000 mm. dia	RM	438.00
8.12.1.5	Above 1000 mm.Upto 1200 mm. dia.	RM	479.00

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
8.12.2	8 mm to 12 mm thick.		
8.12.2.1	From 750 mm. Upto1000 mm. dia.	RM	530.00
8.12.2.2	Above 1000 mm.Upto 1200 mm. dia	RM	601.00
8.12.2.3	Above 1200 mm.Upto 1500 mm. Dia	RM	739.00
8.12.2.4	Above 1500 mmUpto 1700 mm. dia	RM	772.00
8.12.2.5	Above 1700 mm.Upto 1800 mm dia	RM	803.00
8.13	Labour Only for lowering & laying, jointing of M.S. specials such as distance pieces, straps etc. including all site arrangements complete.		
8.13.1	5 mm to 8 mm thick.		
	Up to 250 mm. dia.	RM	77.00
	Above 250 mm.Upto 500 mm. dia.	RM	95.00
	Above 500 mm.Upto 750 mm. dia.	RM	352.00
	Above 750 mm.Upto 1000 mm. dia.	RM	153.00
	Above 1000 mm.Upto 1250 mm. dia.	RM	168.00
8.13.2	8 mm to 12 mm thick.		
	From 750 mm Upto1000 mm. dia.	RM	90.00
	Above 1000 mm Upto 1200 mm. dia.	RM	210.00
	Above 1200 mm.Upto 1500 mm. dia.	RM	259.00
	Above 1500 mm.Upto 1700 mm. dia.	RM	270.00
	Above 1700 mm Upto 2000 mm. dia.	RM	281.00
8.14	Welding in all positions M.S.Pipes,		
	Butt Joints : Plate Thickness		
8.14.1	4 mm.	RM	67.00
8.14.2	5 mm.	RM	106.00
8.14.3	6 mm.	RM	135.00
8.14.4	7 mm.	RM	165.00
8.14.5	8 mm.	RM	275.00
8.14.6	10mm.	RM	339.00
8.15	Providing & Fixing M.S. Repair Saddle complete. As per technical specification.	Each	200.00

CHAPTER- 9

ASBESTOS CEMENT PRESSURE PIPES AND CAST IRON FITTINGS

- 1 Asbestos Cement Pressure Pipes & Asbestos Cement Couplings – Asbestos cement pressure pipes & Asbestos Cement Couplings shall conform to IS:1592-2003(Reaffirmation year 2018)
- 2 Cast Iron detachable Joints for use with asbestos cement pressure pipe shall be as per IS 8794 : 1988(Reaffirmation year 2017)
- 3 Cast Iron Specials for ACP Pipe shall conform to the material and strength requirements of IS: 5531-2014(Reaffirmation year 2020)
- 4 Rubber rings – Rubber rings used in jointing shall comply with the requirements of IS: 10292 -1988.(Reaffirmation year 2017)
- 5 Laying of pipe shall be as per IS Code : 6530 : 1972.(Reaffirmation year 2017)
- 6 All the pipes, Specials Joints to be used in the work shall conform to relevant Indian Standards only, inspected and tested and having B.I.S. certification marks.
- 7 Asbestos Cement Pipes & AC Couplings suitable for use in Sewerage & drainage, applications shall be confirming to IS 6908:1991 with up to date amendments.
- 8 Testing
 - 8.1 The pipes shall be tested as specified in IS: 5913-1970 in the factory. Hence the purpose of field testing is to check the quality of workman ship and also to check whether the pipes have been damaged in transits. As such, the test pressure shall be kept as 1.5 times the actual operating pressure, unless a higher test pressure is specified.
 - 8.2 It is recommended to test the portions of the line by subjecting to pressure test as the laying progresses before the entire line is completed. In this way any error of workmanship will be found immediately and can be corrected at a minimum cost.
 - 8.3 Usually the length of the section to be tested shall not exceed 500m.
 - 8.4 Prior to testing enough back fill shall be placed over the pipeline to resist upward thrust. All thrust blocks forming part of the finished line shall have been sufficiently cured and no temporary bracing shall be used.
 - 8.5 The open end of the section can be sealed temporarily with an end cap having an outlet which can serve as an air relief vent or for filling the line or for filling the line, as may be required.
 - 8.6 The blind face of the end cap shall be properly braced during testing by screw jacks and wooden planks or steel plate.
 - 8.7 The section of the line to be tested shall be filled with water manually or by a low pressure pump. Air shall be vented from all high spots in the pipeline before making the pressure strength test because required pressure for the pressure strength test.

8.8 Asbestos cement pipes always absorb a certain amount of water. Therefore, after the line is filled, it should be allowed to stand for 24 hours, before pressure testing and the line shall be again filled.

8.9 The test pressure shall be gradually raised at the rate of approximately one kg/cm²/min.

8.10 The duration of the test period if not specified shall be sufficient to make a careful check on the pipeline section.

8.11 After the test has been completed, the trench shall be filled back. Care shall be taken to avoid back filling with large stones which might damage the pipe.

- 9 Items of ACP Pipes shall be used in repair work only. As far as possible ACP Pipes shall be replaced preferably by PVC Pipe using suitable detachable joints.
- 10 Laying of pipes and fittings/specials includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.
- 11 Measurements :-
The net length of pipe as laid or installed shall be measured in running meter correct to a cm. specials shall be excluded and measured and paid separately under the
- 12 Rates :-
- (i) The rates include charges for all tools and plants, chain, pulley blocks and other appliances etc for lifting and laying the pipes and fittings in position as per approved drawings.
- (ii) The rates include provision and use of all covering etc. to protect the work from inclement weather etc. and from damages from fall for materials and other causes.
- (iii) The rates include provision of handling, storing under cover as required and returning of empty cases or containers to the Urban local body store. The material may be supplied from local body store, without any extra cost for all such materials. No transportation charges from carting of material to site of work from store shall be paid.
- (iv) These rates of A.C. Pipes shall not be used for any new works and shall be only for maintenance and repair works.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER NO. 9 ASBESTOS CEMENT PRESSURE PIPES AND CAST IRON FITTINGS

S.No.	Particulars of Items	Unit	Rate (in Rs)		
9.1	Providing, Laying, Jointing & Testing of Asbestos cement pressure pipe ISI marked and conforming to IS-1592/03 tested to the required pressure including cost of pipes all complete.		Class 25	Class 15	Class 20
9.1.1	80mm	Meter	377.00	326.00	345.00
9.1.2	100mm	Meter	506.00	377.00	492.00
9.1.3	125mm	Meter	660.00	410.00	642.00
9.1.4	150mm	Meter	970.00	721.00	896.00
9.1.5	200mm	Meter	1581.00	1041.00	1250.00
9.1.6	250mm	Meter	2030.00	1270.00	1697.00
9.1.7	300mm	Meter	2954.00	1765.00	2275.00
9.1.8	350mm	Meter	3871.00	1938.00	2509.00
9.2	Providing, laying & jointing of Asbestos cement pressure pipe with A.C. coupler Joint ISI marked and conforming to IS-1592/03 tested to the required pressure including testing of joints, cost of pipes all complete.		Class 25	Class 15	Class 20
9.2.1	80mm	Meter	529.00	408.00	420.00
9.2.2	100mm	Meter	554.00	366.00	453.00
9.2.3	125mm	Meter	717.00	470.00	576.00
9.2.4	150mm	Meter	935.00	572.00	875.00
9.2.5	200mm	Meter	1516.00	949.00	1195.00
9.2.6	250mm	Meter	2023.00	1269.00	1620.00
9.2.7	300mm	Meter	2896.00	1753.00	2273.00
9.2.8	350mm	Meter	2969.00	2056.00	2493.00
9.3	Labour for laying in position Asbestos cement pressure pipes Class 25,15,20				
9.3.1	80mm	Meter		6.00	
9.3.2	100mm	Meter		8.00	
9.3.3	125mm	Meter		11.00	
9.3.4	150mm	Meter		15.00	
9.3.5	200mm	Meter		26.00	
9.3.6	250mm	Meter		35.00	
9.3.7	300mm	Meter		48.00	
9.3.8	350mm	Meter		52.00	

S.No.	Particulars of Items	Unit	Rate (in Rs)		
9.4	Providing & fixing detachable joints to asbestos cement pressure pipes and fittings including C.I. detachable joints conforming to IS/8794/1988 with bolts, nuts and rubber rings		Class 25	Class 15	Class 20
9.4.1	80mm	Each	342.00	260.00	331.00
9.4.2	100mm	Each	435.00	332.00	422.00
9.4.3	125mm	Each	575.00	444.00	530.00
9.4.4	150mm	Each	667.00	532.00	658.00
9.4.5	200mm	Each	1026.00	785.00	961.00
9.4.6	250mm	Each	1303.00	979.00	1197.00
9.4.7	300mm	Each	1638.00	1230.00	1466.00
9.4.8	350mm	Each	2410.00	1481.00	2072.00
9.5	Labour for providing detachable joints to asbestos cement pressure pipes and fittings Class 25, 15 & 20 including testing of joints but excluding cost of C.I. Detachable joints.				
9.5.1	80mm	Each	64.00		
9.5.2	100mm	Each	89.00		
9.5.3	125mm	Each	105.00		
9.5.4	150mm	Each	115.00		
9.5.5	200mm	Each	129.00		
9.5.6	250mm	Each	137.00		
9.5.7	300mm	Each	156.00		
9.5.8	350mm	Each	174.00		
9.6	Providing and laying in position Cast Iron plain ended 90 degree bends.		Class 25	Class 15	Class 20
9.6.1	80mm	Each	761.00	590.00	674.00
9.6.2	100mm	Each	1142.00	821.00	1008.00
9.6.3	125mm	Each	1580.00	1149.00	1395.00
9.6.4	150mm	Each	2241.00	1628.00	1993.00
9.6.5	200mm	Each	3919.00	2829.00	3466.00
9.6.6	250mm	Each	5609.00	4135.00	5064.00
9.6.7	300mm	Each	8213.00	6038.00	7416.00
9.6.8	350mm	Each	10580.00	7481.00	9104.00
9.7	Labour for laying in position Cast Iron plain ended 90 degree bends.		Class 25	Class 15	Class 20
9.7.1	80mm	Each	19.00	14.00	15.00
9.7.2	100mm	Each	29.00	18.00	24.00
9.7.3	125mm	Each	35.00	28.00	32.00
9.7.4	150mm	Each	53.00	38.00	47.00
9.7.5	200mm	Each	95.00	65.00	81.00
9.7.6	250mm	Each	127.00	91.00	112.00
9.7.7	300mm	Each	187.00	132.00	162.00
9.7.8	350mm	Each	205.00	166.00	188.00

S.No.	Particulars of Items	Unit	Rate (in Rs)		
9.8	Providing and laying in position Cast Iron plain ended 45 degree bends.		Class 25	Class 15	Class 20
9.8.1	80mm	Each	801.00	623.00	711.00
9.8.2	100mm	Each	1170.00	841.00	1035.00
9.8.3	125mm	Each	1573.00	1132.00	1391.00
9.8.4	150mm	Each	2183.00	1586.00	1934.00
9.8.5	200mm	Each	3693.00	2639.00	3254.00
9.8.6	250mm	Each	5114.00	3707.00	4572.00
9.8.7	300mm	Each	7358.00	5277.00	6532.00
9.8.8	350mm	Each	8728.00	6065.00	7496.00
9.9	Labour for laying in position Cast Iron plain ended 45 degree bends.		Class 25	Class 15	Class 20
9.9.1	80mm	Each	18.00	14.00	14.00
9.9.2	100mm	Each	22.00	18.00	22.00
9.9.3	125mm	Each	30.00	24.00	30.00
9.9.4	150mm	Each	39.00	35.00	43.00
9.9.5	200mm	Each	61.00	59.00	73.00
9.9.6	250mm	Each	89.00	83.00	102.00
9.9.7	300mm	Each	126.00	118.00	146.00
9.9.8	350mm	Each	150.00	137.00	173.00
9.10	Providing and laying in position Cast Iron plain ended 22.5 degree bends.		Class 25	Class 15	Class 20
9.10.1	80mm	Each	576.00	432.00	493.00
9.10.2	100mm	Each	847.00	583.00	728.00
9.10.3	125mm	Each	1135.00	773.00	961.00
9.10.4	150mm	Each	1589.00	1091.00	1349.00
9.10.5	200mm	Each	2712.00	1817.00	2273.00
9.10.6	250mm	Each	3645.00	2477.00	3114.00
9.10.7	300mm	Each	5244.00	3514.00	4431.00
9.10.8	350mm	Each	6719.00	4407.00	5570.00
9.11	Labour for laying in position Cast Iron plain ended 22.5 degree bends.		Class 25	Class 15	Class 20
9.11.1	80mm	Each	14.00	10.00	12.00
9.11.2	100mm	Each	19.00	14.00	18.00
9.11.3	125mm	Each	25.00	18.00	22.00
9.11.4	150mm	Each	37.00	26.00	32.00
9.11.5	200mm	Each	65.00	43.00	55.00
9.11.6	250mm	Each	88.00	59.00	75.00
9.11.7	300mm	Each	127.00	83.00	106.00
9.11.8	350mm	Each	152.00	97.00	128.00

S.No.	Particulars of Items	Unit	Rate (in Rs)		
9.12	Providing and laying in position Cast Iron plain ended 11¼ degree bends.		Class 25	Class 15	Class 20
9.12.1	80mm	Each	498.00	366.00	413.00
9.12.2	100mm	Each	748.00	492.00	623.00
9.12.3	125mm	Each	988.00	646.00	810.00
9.12.4	150mm	Each	1394.00	918.00	1146.00
9.12.5	200mm	Each	2398.00	1536.00	1948.00
9.12.6	250mm	Each	3149.00	2034.00	2604.00
9.12.7	300mm	Each	4525.00	2884.00	3701.00
9.12.8	350mm	Each	5535.00	3486.00	4494.00
9.13	Labour for laying in position Cast Iron plain ended 11¼ degree bends.		Class 25	Class 15	Class 20
9.13.1	80mm	Each	11.00	8.00	10.00
9.13.2	100mm	Each	17.00	12.00	14.00
9.13.3	125mm	Each	21.00	14.00	18.00
9.13.4	150mm	Each	32.00	20.00	26.00
9.13.5	200mm	Each	52.00	37.00	45.00
9.13.6	250mm	Each	74.00	47.00	61.00
9.13.7	300mm	Each	102.00	67.00	85.00
9.13.8	350mm	Each	131.00	86.00	111.00
9.14	Providing and laying in position Cast Iron plain ended Tees Body & Branch.		Class 25	Class 15	Class 20
9.14.1	80 x 80 mm	Each	984.00	747.00	855.00
9.14.2	100 x 80 mm	Each	1261.00	969.00	1116.00
9.14.3	100 x 100mm	Each	1516.00	1069.00	1323.00
9.14.4	125 x 80 mm	Each	1639.00	1231.00	1463.00
9.14.5	125 x 100mm	Each	1956.00	1363.00	1739.00
9.14.6	125 x 125mm	Each	2142.00	1532.00	1879.00
9.14.7	150 x 80mm	Each	2540.00	1864.00	2255.00
9.14.8	150 x 100mm	Each	2697.00	1946.00	2387.00
9.14.9	150 x125 mm	Each	2859.00	2055.00	2517.00
9.14.10	150 x 150 mm	Each	3103.00	2240.00	2741.00
9.14.11	200 x 80 mm	Each	4374.00	3187.00	3879.00
9.14.12	200 x100mm	Each	4528.00	3279.00	4152.00
9.14.13	200 x125 mm	Each	4698.00	3394.00	4381.00
9.14.14	200 x 150mm	Each	4952.00	3640.00	4914.00
9.14.15	200 x 200mm	Each	5597.00	4009.00	5723.00
9.14.16	250 x 80 mm	Each	6326.00	4710.00	5876.00
9.14.17	250 x 100mm	Each	6487.00	4802.00	5880.00
9.14.18	250 x 125mm	Each	6672.00	4934.00	6035.00
9.14.19	250 x 150mm	Each	6941.00	5126.00	6272.00
9.14.20	250 x 200mm	Each	7603.00	5579.00	6835.00
9.14.21	250 x250mm	Each	8164.00	5995.00	7365.00
9.14.22	300 x 80mm	Each	9321.00	6934.00	8466.00

S.No.	Particulars of Items	Unit	Rate (in Rs)		
9.14.23	300x 100mm	Each	9478.00	7026.00	8621.00
9.14.24	300 x 125mm	Each	9709.00	7166.00	8773.00
9.14.25	300 x 150mm	Each	9863.00	7281.00	8928.00
9.14.26	300 x 200mm	Each	10631.00	7851.00	9620.00
9.14.27	300 x 250mm	Each	10946.00	8312.00	10159.00
9.14.28	300 x 300mm	Each	12249.00	8929.00	11006.00
9.14.29	350x200mm	Each	14262.00	10083.00	12323.00
9.14.30	350x250mm	Each	14938.00	10530.00	12848.00
9.14.31	350x300mm	Each	15903.00	11203.00	13668.00
9.14.32	350x350mm	Each	16807.00	11800.00	14489.00
9.15	Labour for laying in position Cast Iron plain ended Tees Body & Branch.		Class 25	Class 15	Class 20
9.15.1	80 x 80 mm	Each	22.00	18.00	20.00
9.15.2	100 x 80 mm	Each	29.00	22.00	26.00
9.15.3	100 x 100mm	Each	35.00	24.00	30.00
9.15.4	125 x 80 mm	Each	38.00	29.00	35.00
9.15.5	125 x 100mm	Each	47.00	32.00	41.00
9.15.6	125 x 125mm	Each	52.00	37.00	45.00
9.15.7	150 x 80mm	Each	59.00	45.00	53.00
9.15.8	150 x 100mm	Each	67.00	45.00	57.00
9.15.9	150 x125 mm	Each	70.00	49.00	59.00
9.15.10	150 x 150 mm	Each	74.00	53.00	65.00
9.15.11	200 x 80 mm	Each	105.00	75.00	91.00
9.15.12	200 x100mm	Each	109.00	77.00	93.00
9.15.13	200 x125 mm	Each	113.00	79.00	97.00
9.15.14	200 x 150mm	Each	119.00	85.00	104.00
9.15.15	200 x 200mm	Each	133.00	94.00	116.00
9.15.16	250 x 80 mm	Each	155.00	110.00	134.00
9.15.17	250 x 100mm	Each	158.00	112.00	138.00
9.15.18	250 x 125mm	Each	163.00	116.00	142.00
9.15.19	250 x 150mm	Each	169.00	120.00	146.00
9.15.20	250 x 200mm	Each	185.00	130.00	160.00
9.15.21	250 x250mm	Each	197.00	140.00	173.00
9.15.22	300 x 80mm	Each	227.00	162.00	199.00
9.15.23	300x 100mm	Each	234.00	164.00	203.00
9.15.24	300 x 125mm	Each	240.00	169.00	205.00
9.15.25	300 x 150mm	Each	242.00	171.00	209.00
9.15.26	300 x 200mm	Each	259.00	185.00	226.00
9.15.27	300 x 250mm	Each	273.00	195.00	238.00
9.15.28	300 x 300mm	Each	299.00	210.00	258.00
9.15.29	350x200mm	Each	340.00	243.00	297.00
9.15.30	350x250mm	Each	360.00	253.00	311.00
9.15.31	350x300mm	Each	378.00	270.00	329.00
9.15.32	350x350mm	Each	407.00	284.00	349.00

S.No.	Particulars of Items	Unit	Rate (in Rs)		
			Class 25	Class 15	Class 20
9.16	Providing and laying in position Cast Iron plain ended Crosses.		Class 25	Class 15	Class 20
9.16.1	80 x 80mm	Each	1300.00	994.00	1123.00
9.16.2	100 x 100mm	Each	2020.00	1408.00	1750.00
9.16.3	125 x 125mm	Each	2834.00	2004.00	2460.00
9.16.4	150x 150mm	Each	4111.00	2941.00	3598.00
9.16.5	200 x 200mm	Each	7411.00	5271.00	6466.00
9.16.6	250 x 250mm	Each	10754.00	7816.00	9609.00
9.16.7	300 x 300mm	Each	16047.00	11656.00	14330.00
9.16.8	350x350mm	Each	21678.00	15248.00	18626.00
9.17	Labour for laying in position Cast Iron plain ended Crosses.		Class 25	Class 15	Class 20
9.17.1	80 x 80mm	Each	26.00	22.00	24.00
9.17.2	100 x 100mm	Each	46.00	30.00	38.00
9.17.3	125 x 125mm	Each	63.00	45.00	55.00
9.17.4	150x 150mm	Each	90.00	66.00	79.00
9.17.5	200 x 200mm	Each	165.00	120.00	144.00
9.17.6	250 x 250mm	Each	244.00	180.00	213.00
9.17.7	300 x 300mm	Each	361.00	270.00	316.00
9.17.8	350x350mm	Each	483.00	350.00	426.00
9.18	Providing and laying in position Cast Iron plain ended Reducers.		Class 25	Class 15	Class 20
9.18.1	100 x80mm	Each	885.00	651.00	776.00
9.18.2	125 x 80mm	Each	1046.00	769.00	915.00
9.18.3	125 x 100mm	Each	1202.00	854.00	1048.00
9.18.4	150 x 80mm	Each	1288.00	939.00	1126.00
9.18.5	150 x 100mm	Each	1449.00	1025.00	1264.00
9.18.6	150 x 125 mm	Each	1613.00	1141.00	1397.00
9.18.7	200 x 100mm	Each	2032.00	1412.00	1746.00
9.18.8	200 x 125mm	Each	2208.00	1520.00	1879.00
9.18.9	200 x 150mm	Each	2446.00	1698.00	2095.00
9.18.10	250 x 125mm	Each	2662.00	1847.00	2221.00
9.18.11	250 x 150mm	Each	2910.00	2025.00	2515.00
9.18.12	250 x 200mm	Each	3489.00	2407.00	2995.00
9.18.13	300 x 150mm	Each	3685.00	2522.00	3150.00
9.18.14	300 x 200mm	Each	4279.00	2909.00	3633.00
9.18.15	300 x 250mm	Each	4715.00	3221.00	3879.00
9.18.16	350 x 300mm	Each	7625.00	5366.00	6609.00

S.No.	Particulars of Items	Unit	Rate (in Rs)		
			Class 25	Class 15	Class 20
9.19	Labour for laying in position Cast Iron plain ended Reducers.				
			Class 25	Class 15	Class 20
9.19.1	100 x80mm	Each	21.00	14.00	18.00
9.19.2	125 x 80mm	Each	23.00	18.00	20.00
9.19.3	125 x 100mm	Each	27.00	20.00	24.00
9.19.4	150 x 80mm	Each	30.00	22.00	26.00
9.19.5	150 x 100mm	Each	31.00	24.00	28.00
9.19.6	150 x 125 mm	Each	37.00	26.00	32.00
9.19.7	200 x 100mm	Each	47.00	32.00	41.00
9.19.8	200 x 125mm	Each	63.00	35.00	45.00
9.19.9	200 x 150mm	Each	58.00	38.00	49.00
9.19.10	250 x 125mm	Each	62.00	43.00	53.00
9.19.11	250 x 150mm	Each	68.00	47.00	59.00
9.19.12	250 x 200mm	Each	78.00	57.00	69.00
9.19.13	300 x 150mm	Each	85.00	59.00	73.00
9.19.14	300 x 200mm	Each	103.00	67.00	85.00
9.19.15	300 x 250mm	Each	106.00	75.00	89.00
9.19.16	350 x 300mm	Each	187.00	131.00	162.00
9.20	Providing and laying in position Cast Iron Flange spigot (Adopter).				
			Class 25	Class 15	Class 20
9.20.1	80mm	Each	687.00	598.00	637.00
9.20.2	100mm	Each	888.00	734.00	823.00
9.20.3	125mm	Each	1186.00	943.00	1050.00
9.20.4	150mm	Each	1509.00	1236.00	1379.00
9.20.5	200mm	Each	2316.00	1831.00	2082.00
9.20.6	250mm	Each	3700.00	2970.00	3414.00
9.20.7	300mm	Each	4898.00	3856.00	4462.00
9.20.8	350mm	Each	5790.00	4446.00	5142.00
9.21	Labour for laying in position Cast Iron Flange spigot (Adopter).				
			Class 25	Class 15	Class 20
9.21.1	80mm	Each	17.00	14.00	14.00
9.21.2	100mm	Each	20.00	16.00	18.00
9.21.3	125mm	Each	27.00	20.00	24.00
9.21.4	150mm	Each	34.00	29.00	30.00
9.21.5	200mm	Each	52.00	41.00	47.00
9.21.6	250mm	Each	87.00	67.00	77.00
9.21.7	300mm	Each	109.00	85.00	100.00
9.21.8	350mm	Each	141.00	109.00	127.00

S.No.	Particulars of Items	Unit	Rate (in Rs)		
9.22	Providing and laying in position Cast Iron end plugs (Dead end cap).		Class 25	Class 15	Class 20
9.22.1	80mm	Each	413.00	319.00	346.00
9.22.2	100mm	Each	665.00	459.00	516.00
9.22.3	125mm	Each	926.00	638.00	759.00
9.22.4	150mm	Each	1369.00	957.00	1135.00
9.22.5	200mm	Each	2547.00	1746.00	2102.00
9.22.6	250mm	Each	3542.00	2476.00	2973.00
9.22.7	300mm	Each	5287.00	3669.00	4401.00
9.22.8	350mm	Each	5327.00	3766.00	4509.00
9.23	Labour for laying in position Cast Iron end plugs (Dead end cap).		Class 25	Class 15	Class 20
9.23.1	80mm	Each	8.00	6.00	6.00
9.23.2	100mm	Each	11.00	8.00	10.00
9.23.3	125mm	Each	15.00	12.00	14.00
9.23.4	150mm	Each	25.00	18.00	22.00
9.23.5	200mm	Each	45.00	35.00	41.00
9.23.6	250mm	Each	64.00	47.00	57.00
9.23.7	300mm	Each	98.00	71.00	85.00
9.23.8	350mm	Each	126.00	91.00	110.00
9.24	Providing and supply of ISI marked Asbestos Cement Pipes conforming to IS 6908:1991 for Sewerage & Drainage Class-I with suitable A.C. coupling & ISI marked rubber ring, duly tested inspection charges, transportation charges, transit insurance, loading/ unloading and stacking at site/ store etc, complete of following sizes:-				
9.24.1	150mm (Length 3mtrs., min.)	Meter		340.00	
9.24.2	200mm (Length 3mtrs., min.)	Meter		531.00	
9.24.3	250mm (Length 4mtrs., min.)	Meter		695.00	
9.24.4	300mm (Length 4mtrs., min.)	Meter		898.00	
9.24.5	350mm (Length 4mtrs., min.)	Meter		1163.00	
9.24.6	400mm (Length 4mtrs., min.)	Meter		1432.00	
9.24.7	450mm (Length 4mtrs., min.)	Meter		1691.00	
9.24.8	500mm (Length 4mtrs., min.)	Meter		2154.00	
9.24.9	600mm (Length 4mtrs., min.)	Meter		2980.00	

S.No.	Particulars of Items	Unit	Rate (in Rs)
9.25	Providing and supply of ISI marked Asbestos Cement Pipes conforming to IS 6908:1991 for Sewerage & Drainage Class-II with suitable A.C. coupling & ISI marked rubber ring, duly tested inspection charges, transportation charges, transit insurance, loading/ unloading and stacking at site/ store etc, complete of following sizes:-		
9.25.1	200mm (Length 3mtrs., min.)	Meter	694.00
9.25.2	250mm (Length 4mtrs., min.)	Meter	890.00
9.25.3	300mm (Length 4mtrs., min.)	Meter	1228.00
9.25.4	350mm (Length 4mtrs., min.)	Meter	1582.00
9.25.5	400mm (Length 4mtrs., min.)	Meter	2043.00
9.25.6	450mm (Length 4mtrs., min.)	Meter	2389.00
9.25.7	500mm (Length 4mtrs., min.)	Meter	3001.00
9.25.8	600mm (Length 4mtrs., min.)	Meter	4271.00
9.26	Providing and supply of ISI marked Asbestos Cement Pipes conforming to IS 6908:1991 for Sewerage & Drainage Class-III with suitable A.C. coupling & ISI marked rubber ring, duly tested , inspection charges, transportation charges, transit insurance, loading/ unloading and stacking at site/ store etc, complete of following sizes:-		
9.26.1	100mm (Length 3mtrs., min.)	Meter	292.00
9.26.2	150mm (Length 3mtrs., min.)	Meter	398.00
9.26.3	200mm (Length 3mtrs., min.)	Meter	681.00
9.26.4	250mm (Length 4mtrs., min.)	Meter	1132.00
9.26.5	300mm (Length 4mtrs., min.)	Meter	1583.00
9.26.6	350mm (Length 4mtrs., min.)	Meter	2045.00
9.26.7	400mm (Length 4mtrs., min.)	Meter	2669.00
9.26.8	450mm (Length 4mtrs., min.)	Meter	3165.00
9.26.9	500mm (Length 4mtrs., min.)	Meter	3956.00
9.26.10	600mm (Length 4mtrs., min.)	Meter	5544.00

CHAPTER- 10

SALT GLAZED STONEWARE PIPE

- 1 Salt glazed stone ware pipe shall be as per IS 651 - 2007(Reaffirmation year 2017). SP1 pipe shall be used having crushing strength of 16kN/m duly inspected and tested and having BIS certification mark.
- 2 Laying of glazed stone ware pipe shall be as per IS 4127:1983(Reaffirmation year 2017)

Laying of pipes and fittings/specials includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/ specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.

3 Transportation of Pipe

(i) While unloading, pipes shall not be thrown from the truck on hard ground.

(ii) Unloading of pipes on timber skids without a steadying rope and thus allowing the pipes to bump hard against one another should not be allowed.

(iii) In order to avoid damage to the pipes and especially to the spigot end, pipes should not be dragged along concrete and similar pavements with hard surfaces.

4 Testing

(i) The pipe and fittings shall be inspected for defects and be rung with a light hammer preferably while suspended, to detect cracks.

(ii) Hydraulic test, Absorption test, test for resistance to action of acid & test for crushing strength etc. shall be done as per clause-7 IS 651:2007(Reaffirmation year 2017).

(iii) Necessary tests of the pipe shall be as per IS 651:2007(Reaffirmation year 2017) and test results shall be kept for record.

(iv) Each section of sewer shall be tested for water tightness preferably between manhole to man hole.

(v) Before commencing the hydraulic test the pipelines shall be filled with water for about a week before commencing the application of pressure to allow for the absorption by pipe wall.

(vi) The sewers are tested by plugging the upper end (with a provision for an air out let) of the pipe with stopcock. The water is filled through a funnel connected at the lower end provided with a plug. After the air has expelled through the air out let, the stop cock is closed and water level in the funnel is noted after 30 minutes and gravity of water required to restore the original water level is determined. The pipe line under pressure is then inspected while the funnel is still in position. There shall be no leaks in the pipe or joints (small sweating on the pipe surface is permitted).

(vii) Any sewer or part there of that does not meet the test shall be emptied and repaired or re-laid as required and tested again.

(viii) The leakage of quantity of water to be supplied to maintain the test pressure during the period of 10 minutes shall not exceed 0.2 litres/mm dia. of pipe per kilometer length per day.

5 Stone ware pipe shall be cement jointed.

6 Back filling of the trench shall not be commenced until the length of pipes there in has been tested and passed.

7 Where pipe are laid under road and pavement subjected to heavy traffic loads the trenches may be covered with R.C.C. slab.

8 Providing and laying cement concrete 1:5:10 (1 cement:5 fine sand: 10 graded stone aggregate 40 mm nominal size) up to haunches of SW – pipes including bed concrete i/c curing, testing etc complete for 100mm to 300mm dia SW pipe For Type "Concrete up to Haunches " shall be as per *Drawing No. 8 (1)*

9 Providing and laying cement concrete 1:5:10 (1 cement:5 fine sand: 10 graded stone aggregate 40 mm nominal size) around S.W. pipe including bed concrete 15 cm thick i/c curing, testing etc. complete for 100 mm dia. to 300 mm dia pipe. (For type" Concrete All round") shall be as per *Drawing No. 8 (2)*

10 Measurement

The length of pipes shall be measured in the running meters nearest to 10mm as laid or fixed, from inside of one manhole to the inside of the other manhole. The length shall be taken, along the centre line of the pipes. Overall fittings, such as bends, junctions, etc., shall not be measured separately. Excavation, refilling, shoring and timbering in trenches and cement concretising where ever required shall be measured separately under relevant item of work.

11 Rates

The rate shall include the cost of material and labour involved in all the operation described above excluding the cost of concrete which shall be paid separately.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 10 -- SALT GLAZED STONEWARE PIPE

S.No.	Particulars of Items	Unit	Rate (in Rs.)
10.1	Providing and Laying and Jointing salt glazed stone ware (S.W.) pipes socket and spigot ISI marked as per IS 651-2007 SP1 class with stiff cement mortar 1:1 including testing of joints etc. complete.		
10.1.1	100 mm	Per Meter	206.00
10.1.2	150 mm	Per Meter	342.00
10.1.3	200 mm	Per Meter	610.00
10.1.4	250 mm	Per Meter	954.00
10.1.5	300 mm	Per Meter	1538.00
10.2	Laying and Jointing salt glazed stone ware (S.W.) pipes s&s (socket and spigot) with stiff cement mortar 1:1 including testing of joints complete.		
10.2.1	100mm	Per Meter	81.00
10.2.2	150 mm	Per Meter	117.00
10.2.3	200 mm	Per Meter	147.00
10.2.4	250 mm	Per Meter	184.00
10.2.5	300 mm	Per Meter	209.00
10.3	Providing, Laying and Jointing salt glazed stone ware (S.W.) Half Round pipes socket and spigot ISI marked as per IS 651-2007 SP1 class with stiff cement mortar 1:1 including testing of joints etc. complete.		
10.3.1	100 mm	Per Meter	144.00
10.3.2	150 mm	Per Meter	239.00
10.3.3	200 mm	Per Meter	427.00
10.3.4	250 mm	Per Meter	668.00
10.3.5	300 mm	Per Meter	1077.00
10.4	Laying and Jointing salt glazed stone ware (S.W.) Half Round pipes s&s (socket and spigot) with stiff cement mortar 1:1 including testing of joints complete.		
10.4.1	100mm	Per Meter	57.00
10.4.2	150 mm	Per Meter	82.00
10.4.3	200 mm	Per Meter	103.00
10.4.4	250 mm	Per Meter	129.00
10.4.5	300 mm	Per Meter	146.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
10.5	Providing and laying Cement concrete grade M-5 (Nominal Mix) with 40 mm nominal size stone aggregate up to haunches of SW – pipes including bed concrete i/c curing, testing etc complete for 100mm to 300mm dia SW pipe For Type "Concrete up to Haunches ") <i>Drawing No. 8 (1)</i>		
10.5.1	100mm dia pipe	Per Meter	275.00
10.5.2	150mm dia	Per Meter	445.00
10.5.3	200mm dia	Per Meter	524.00
10.5.4	250mm dia	Per Meter	609.00
10.5.5	300mm dia	Per Meter	703.00
10.6	Providing and laying Cement concrete grade M-5 (Nominal Mix) with 40 mm nominal size stone aggregate around S.W. pipe including bed concrete 15 cm thick i/c curing, testing etc. complete for 100 mm dia. to 300 mm dia pipe. (For type" Concrete Around") <i>Drawing No. 8 (2)</i>		
10.6.1	100mm dia SW pipe	Per Meter	578.00
10.6.2	150mm dia	Per Meter	707.00
10.6.3	200mm dia	Per Meter	824.00
10.6.4	250mm dia	Per Meter	953.00
10.6.5	300mm dia	Per Meter	1094.00

CHAPTER- 11

Unplasticized Non-Pressure Polyvinyl Chloride (PVC-U) Pipes, DWC Pipes.

- 1 Unplasticized polyvinyl chloride (PVC - U) pipes shall be as per IS 15328:2003(Reaffirmation year 2018). & having BIS Certification mark.
- 2 Laying of Unplasticized polyvinyl chloride (PVC - U) pipe shall be as per IS 7634 (Part-3) : 2003(Reaffirmation year 2018)
- 3 The solvent cement shall conform to the requirements laid down in IS 14182:1994(Reaffirmation year 2015)
- 4 Integral sockets for either solvent-cement welding or for jointing with elastomeric sealing rings pipes made of unplasticized polyvinyl chloride (PVC-U) of nominal outside diameters ranging from 110mm upto and including 630 mm, intended for underground (buried) non-pressure gravity drain and sewer applications for transportation of soil and waste discharge of domestic origin, surface water (storm water).
- 5 Dimensions of Pipes :
 - (i) Mean outside diameter :- The mean outside diameter, outside diameter at any point and tolerances shall be as give in the table 1 of IS 15328 and shall be measured according to the method in IS:12235 (part-1).
 - (ii) Wall thickness :- The nominal wall thickness, e, shall be in accordance with table 2 of IS 15328. Tolerances in outside diameters shall be those given in IS 4985.
- 6 Marking :-

The colour of marking shall be different from the basic colour of the pipe. It shall be as under.

 - (i) Identification of the source of manufacture.
 - (ii) Outside diameter,
 - (iii) Stiffness class, and
 - (iv) Batch or lot number
- 7 Joints :

Elastomeric Sealing rings :- Elastomeric sealing rings shall be free from substances (for example, plasticizers) that can have a detrimental effect on the polyvinyl chloride of the pipe or fittings used in conjunction with the pipes.

- 8 Laying of pipes includes all precautions to guard against possible damaged to the existing structure/pipes lines, cables etc., taking precautions to prevent dirt from entering the pipe ends, lowering and laying pipes and specials in the trenches with specials arrangement such as cranes, tripods with chain pulley block, use of slings of canvas etc. to fit the ends of pipes and fittings/ specials to lift and lower the same. Inspection of pipes and fittings for defects by striking with a light hammer while suspended. Laying of pipes perfectly true in alignment and to gradient etc.
- 9 Minimum Cover
 - 9.1 A minimum cover of 0.9 m should be ensured when normal truck traffic is expected and 1.8m should ensured when heavy truck traffic is expected.
 - 9.2 Bedding and backfill material must be free from boulders, sharp stones, flints etc.
 - 9.3 Bedding should be prepared by laying on soft soil duly compacting and watering so that thickness of bedding is 100 mm to 150 mm. Please refer *Drawing No. 3*
- 10 Providing and supply of DWC PE pipes and fittings IS 16098 (Part-II) : 2013 and class SN8 for non pressure underground sewerage drainage application as per EN: 13476-3 is also given in the given chapter. Pipes and fittings shall be as per relevant BIS/ISO specifications. Material should be used after obtaining third party quality assurance certificate
- 11 Measurement

All measurement should be of the finished work only. The net length of pipes as laid or fixed shall be measured in running meters correct to 10mm. The portion of the pipe inside the joints shall not be included in the length of pipe work. Excavation, refilling, masonry and concrete work wherever required shall be measured and paid for separately under relevant items of work.
- 12 Rates

The rate shall include the cost of material and labour involved in all the operation described above excluding the cost of concrete which shall be paid separately.

(ii) The rates include provision and use of all coverings etc. to protect the works from inclement weather etc. and from damages from fall of materials, and other causes.

(iii) The rate include provision of handling, storing under cover as required and returning of empty cases or container to U.A.D. Department stores without any extra cost, for such materials as may be supplied by the department.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

**CHAPTER 11 -- Unplasticized Non-Pressure Polyvinyl Chloride (PVC-U)
Pipes, DWC Pipes.**

S.No.	Particulars of Items	Unit	Rates (in Rs.)
11.1	Providing, laying and jointing following P.V.C. - U pipes with solvent cement joint for Non-pressure gravity drain and sewer applications including testing of joints, cost of jointing materials etc. complete in all respect.		
11.1.1	110 mm dia.	Per Meter	214.00
11.1.2	125 mm dia	Per Meter	295.00
11.1.3	160 mm dia	Per Meter	402.00
11.1.4	200 mm dia	Per Meter	703.00
11.1.5	250 mm dia	Per Meter	1147.00
11.2	Providing, Laying & Jointing of DWC (double wall corrugated) PE Pipes of renowned duly tested inclusive of all cost of inspection charges, transportation charges, transit insurance, loading/ unloading and stacking at site/ store etc, complete.		
	Internal dia /Outer dia		
11.2.1	76 mm / 90 mm	Meter	101.00
11.2.2	100 mm / 120 mm	Meter	155.00
11.2.3	135 mm / 160 mm	Meter	220.00
11.2.4	150 mm/ 180 mm	Meter	320.00
11.2.5	170 mm / 200 mm	Meter	343.00
11.2.6	200 mm / 238 mm	Meter	538.00
11.2.7	250 mm / 295 mm	Meter	882.00
11.2.8	300 mm / 345 mm	Meter	1260.00
11.2.9	400 mm / 480 mm	Meter	1753.00
11.2.10	500 mm / 580 mm	Meter	2622.00
11.2.11	600 mm / 715 mm	Meter	4186.00
11.2.12	800 mm / 950 mm	Meter	6905.00
11.2.13	1000 mm / 1200 mm	Meter	10413.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
11.3	Providing, Laying & Jointing fittings for structural wall polyethylene piping systems (pipe with online/offline coupler, bends and elasticmeric sealing ring) with non-smooth external annular corrugated and smooth internal surfaces (double wall) for non-pressure underground sewerage, drainage.		
11.3.1	Coupler		
11.3.1.1	100 mm	Each	62.00
11.3.1.2	135 mm	Each	104.00
11.3.1.3	150 mm	Each	118.00
11.3.1.4	170 mm	Each	118.00
11.3.1.5	200 mm	Each	144.00
11.3.1.6	250 mm	Each	191.00
11.3.1.7	300 mm	Each	801.00
11.3.1.8	400 mm	Each	1167.00
11.3.1.9	500 mm	Each	1730.00
11.3.1.10	600 mm	Each	3384.00
11.3.1.11	800 mm	Each	4377.00
11.3.1.12	1000 mm	Each	9275.00
11.3.2	Bends		
11.3.2.1	100 mm	Each	339.00
11.3.2.2	135 mm	Each	447.00
11.3.2.3	150 mm	Each	588.00
11.3.2.4	170 mm	Each	816.00
11.3.2.5	200 mm	Each	946.00
11.3.2.6	250 mm	Each	1852.00
11.3.2.7	300 mm	Each	2919.00
11.3.2.8	400 mm	Each	4642.00
11.3.2.9	500 mm	Each	7316.00
11.3.2.10	600 mm	Each	11155.00
11.3.2.11	800 mm	Each	23902.00
11.3.2.12	1000 mm	Each	34293.00
11.3.3	Sealing Ring		
11.3.3.1	100 mm	Each	21.00
11.3.3.2	135 mm	Each	27.00
11.3.3.3	150 mm	Each	33.00
11.3.3.4	170 mm	Each	45.00
11.3.3.5	200 mm	Each	79.00
11.3.3.6	250 mm	Each	165.00
11.3.3.7	300 mm	Each	417.00
11.3.3.8	400 mm	Each	645.00
11.3.3.9	500 mm	Each	975.00
11.3.3.10	600 mm	Each	2153.00
11.3.3.11	800 mm	Each	5172.00
11.3.3.12	1000 mm	Each	7290.00

CHAPTER- 12

REINFORCED CEMENT CONCRETE PIPES

- 1 All the pipes, specials, joints to be used in the work shall be as per Indian Standards 458 - 2003(Reaffirmation year 2018) duly inspected and tested and having BIS certification mark .
Cement used in the manufacture of Reinforced cement concrete pipes used in sewerage shall conform to IS 12330 (for sulphate resistant cement)
- 2 Laying and Jointing shall be as per IS 783:1985(Reaffirmation year 2017)
- 3 Transportation :-
 - (1) Reasonable care shall be exercised in loading, transporting and unloading concrete pipes. Handling shall be such as to avoid impact. Gradual unloading by inclined plane or by chain block is recommended.
- 4 Tests to be conducted at manufacturing units before taking delivery :-
 - 4.1 All samples for testing purpose shall be selected at random.
 - 4.2 Samples of pipes shall be subjected to following test in accordance with IS : 3597:1998(Reaffirmation year 2018)
 - 4.2.1 Hydrostatic test
 - 4.2.2 Three edge bearing test
 - 4.2.3 Permeability test
 - 4.3 At the time manufacture of such pipes compressive strength of the concrete cubes shall be tested as per IS : 516:1959(Reaffirmation year 2018)
- 5 Laying of Pipe :-
 - 5.1 Pipes shall be lowered in to the trench carefully by mechanical appliances. Under no circumstances shall the pipes be dropped or dumped in to the trench.
 - 5.2 All pipe sections and connections shall be inspected carefully before being laid. Broken or defective pipes or connections shall not be used.
 - 5.3 All lumps, blisters and excess coating materials shall be removed gently from the ends of each pipe and they should be wiped clean and dry before the pipe is laid.
 - 5.4 In the case of pipes with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid.
 - 5.5 Every precaution shall be taken to prevent foreign materials from entering the pipe when it is being placed in the line.
 - 5.6 Pipes shall be laid true to line and grade as specified.

5.7 Sight rails provided at all change of directions or gradients and at distances of about 15 meters. Straight lengths with centre line marked on each horizontal rail which is fixed at true level, shall be used for laying all invert with the help of proper boning rods.

5.8 Laying of pipes shall always proceed upgrade of a slope. If the pipes have spigot and socket joints, the socket ends shall face upstream. In the case of pipes with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid.

5.9 The pipe shall be secured in place with approved back fill material or concrete tamped under it except at the joint portion.

5.10 Precautions shall be taken to prevent dirt from entering the joint space.

5.11 At times when pipe laying is not in progress the open ends of pipe shall be closed by a water tight plug or canvas or other means approved by the Engineer in charge.

5.12 Trench shall be kept free from water until the material in the joints has hardened.

5.13 When the pipe is closed and the trench liable to be flooded by rain, care shall be taken to prevent the pipe from damage.

5.14 Walking or working on the completed pipe shall not be permitted until the trench has been back filled to a height of at least 30 cm over the pipe, except as may be necessary in tamping or back filling.

5.15 The cutting of pipe for inserting, fittings or closure pieces shall be done in a neat and workmanlike manner without danger to the pipe so as to leave a smooth surface and at right angles to the axis of the pipe.

5.16 The connection to an existing sewer shall be done through manholes.

5.17 Before connecting a pipe to a manhole, a relieving arch or any other similar protection device should be made in the manhole for the safety of the pipe.

5.18 The pipe when laid should not be subjected to super imposed load beyond what the pipe can safely take up.

6 Pipe Bedding: (See Drawing No.- 9)

6.1 In case where the foundation conditions are unsafe such as in the proximity of trees or poles, under existing or proposed tracks, under manholes etc; the pipe shall be encased, in low strength concrete bedding or compacted sand or gravel.

6.2 The following class of pipe beddings are recommended as per CPHEEO manual. The class of bedding depends upon the site condition and loading.

Class A bedding- It may be either concrete cradle or concrete arch depending upon the design.

Class B bedding- It is having a shaped bottom or compacted granular bedding with a carefully compacted back fill.

Class C bedding- It is ordinary bedding having a compacted granular bedding with a lightly compacted back fill.

6.3 The pipe bedding materials must remain firm and not permit displacement of pipes. Where rock or other unyielding foundation material is encountered, bedding shall be according to one of the classes A, B or C but with the following additional requirements.

6.3.1 Class A bedding-The hard unyielding material should be excavated down to the bottom of the concrete cradle.

6.3.2 Class B or C bedding- The hard unyielding material should be excavated below the bottom of the pipe and pipe bell to depth of at least 15cm.

6.3.3 The width of trench should be at least 1.25 times the outside dia of pipe and it should be refilled with granular material.

6.4 When the pipe is laid in a trench in rock, hard clay, shale or other hard material, the space below the pipe shall be excavated and replaced with an equalising bed of concrete, sand or compacted earth. In no place the pipe shall be laid directly on such hard material.

7 Jointing : (See Drawing No.-10)

7.1 The socket and spigot pipes are laid and jointed with rubber gasket.

7.2 In case of collar jointed pipe, the jointing shall be done with hemp yarn soaked in cement slurry tamped with just sufficient quantity of water to have a consistency of semi dry condition, well packed and thoroughly rammed with caulking tools and then filled with cement mortar 1:2. The joint shall be finished off with a fillet slopping at 45 degrees to the surface of the pipe. The finished joint shall be protected and cured for at least 24 hours. For jointing procedure should be followed as per I.S. 783 – 1985.

- 8 Testing :- Sampling & testing of pipe shall be done as per IS 458.
- 8.1 Each section of sewer shall be tested for water tightness preferably between manholes.
- 8.2 In case of cement mortar joints, the sewer line shall be tested three days after the cement mortar joints have been made.
- 8.3 The pipe line shall be filled with water for about a week before commencing the application of pressure to allow for the absorption by pipe wall.
- 8.4 The pipe line shall be tested by plugging the upper end with a provision for an air outlet pipe with stop cock. The water shall be filled through a funnel connected at the lower end provided with a plug. After expelling the air through the air outlet, the stop cock shall be closed and water level in the funnel shall be raised to 2.5 m above the invert at the upper end. Water level in the funnel is noted after 30 minutes and the quantity of water required to restore the original water level in the funnel is determined. The pipe line under pressure is then inspected while funnel is still in position. There shall not be any leaks in the pipe or joints (small sweating on the pipe surface is permitted).
- 8.5 Any sewer or part thereof that doesn't meet the test shall be emptied and repaired or re-laid as required and tested again.
- 8.6 The leakage or quantity of water to be supplied to maintain the test pressure during the period of 10 minutes should not exceed 0.2 liters / mm diameter of pipe per Km. length per day.
- 8.7 For non pressure pipes the leakage should be observed for a period of 24 hours if feasible.
- 8.8 Ex filtration test for detection of leakage shall be carried out at a time when the ground water table is low.
- 8.9 Air testing shall be done particularly in large diameter pipes when the required quantity of water is not available for testing. It is done as per procedure given in
- 9 Back filling of trenches:
- 9.1 The method of backfilling to be used shall vary with the width of trench, the character of material excavated, the method of excavation and degree of compaction required.
- 9.2 In open country, it shall be sufficient to mound the trench and after natural settlement return to regrade the areas.
- 9.3 In developed streets, it shall be compacted to minimize the load.

9.4 Soft material screened free from stones or hard substances shall first be used and hand pressed under and around the pipes to half the height. Similar soft material shall then be put up to a height of 30 cm. above the top of pipe and this will be moistened with water and well rammed. The remaining trench can be filled with hard material, in layers each not exceeding 60 cm. At each stage the filling shall be well rammed, consolidated and completely saturated with water and then only further filling shall be continued.

10 If RCC Pipe used in sewerage work , should be manufactured from Sulphate resistant cement.

11 Measurements

All RCC pipes should be measured according to the work actually done. The measurement for pipes should be in running meter nearest to a cm. of length along the centre line of pipe as actually laid at work site.

12 Rates :

The rate shall include the cost of the material and labour involved in all the operation described in the items.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 12 -- REINFORCED CEMENT CONCRETE PIPES

S NO.	Particulars of Items	Unit	Rate (in Rs.)
12.1	Providing, Laying and jointing non-pressure (NP2) RCC socket & spigot pipes with rubber gasket joint including testing of joints.		
12.1.1	100 mm dia	Per Meter	396.00
12.1.2	150 mm dia	Per Meter	407.00
12.1.3	200 mm dia	Per Meter	427.00
12.1.4	225 mm dia	Per Meter	468.00
12.1.5	250 mm dia	Per Meter	506.00
12.1.6	300 mm dia	Per Meter	710.00
12.1.7	350 mm dia	Per Meter	833.00
12.1.8	400 mm dia	Per Meter	955.00
12.1.9	450 mm dia	Per Meter	1156.00
12.1.10	500 mm dia	Per Meter	1256.00
12.1.11	600 mm dia	Per Meter	1631.00
12.1.12	700 mm dia	Per Meter	2085.00
12.1.13	800 mm dia	Per Meter	2867.00
12.1.14	900 mm dia	Per Meter	3522.00
12.1.15	1000 mm dia	Per Meter	4085.00
12.1.16	1100 mm dia	Per Meter	4778.00
12.1.17	1200 mm dia	Per Meter	5920.00
12.1.18	1600 mm dia	Per Meter	10022.00
12.1.19	1800 mm dia	Per Meter	11567.00
12.2	Labour only for Laying and Jointing non-pressure (NP2) RCC socket & spigot pipes with rubber gasket joint including testing of joints.		
12.2.1	100 mm dia	Per Meter	23.00
12.2.2	150 mm dia	Per Meter	30.00
12.2.3	200 mm dia	Per Meter	39.00
12.2.4	225 mm dia	Per Meter	49.00
12.2.5	250 mm dia	Per Meter	49.00
12.2.6	300 mm dia	Per Meter	78.00
12.2.7	350 mm dia	Per Meter	89.00
12.2.8	400 mm dia	Per Meter	101.00
12.2.9	450 mm dia	Per Meter	126.00
12.2.10	500 mm dia	Per Meter	137.00
12.2.11	600 mm dia	Per Meter	185.00
12.2.12	700 mm dia	Per Meter	212.00

S NO.	Particulars of Items	Unit	Rate (in Rs.)
12.2.13	800 mm dia	Per Meter	275.00
12.2.14	900 mm dia	Per Meter	339.00
12.2.15	1000 mm dia	Per Meter	342.00
12.2.16	1100 mm dia	Per Meter	404.00
12.2.17	1200 mm dia	Per Meter	473.00
12.2.18	1600 mm dia	Per Meter	617.00
12.2.19	1800 mm dia	Per Meter	866.00
12.3	Providing and Laying non-pressure (NP3) RCC socket & spigot pipes with rubber gasket joint including testing of joints.		
12.3.1	150 mm dia	Per Meter	437.00
12.3.2	225 mm dia	Per Meter	569.00
12.3.3	250 mm dia	Per Meter	660.00
12.3.4	300 mm dia	Per Meter	964.00
12.3.5	350 mm dia	Per Meter	1662.00
12.3.6	400 mm dia	Per Meter	2047.00
12.3.7	450 mm dia	Per Meter	2287.00
12.3.8	500 mm dia	Per Meter	2533.00
12.3.9	600 mm dia	Per Meter	3549.00
12.3.10	700 mm dia	Per Meter	4180.00
12.3.11	800 mm dia	Per Meter	5725.00
12.3.12	900 mm dia	Per Meter	7060.00
12.3.13	1000 mm dia	Per Meter	7512.00
12.3.14	1100 mm dia	Per Meter	9058.00
12.3.15	1200 mm dia	Per Meter	10691.00
12.3.16	1400 mm dia	Per Meter	12775.00
12.3.17	1600 mm dia	Per Meter	15336.00
12.3.18	1800 mm dia	Per Meter	17930.00
12.4	Labour only for Laying and Jointing non-pressure (NP3)		
12.4.1	150 mm dia	Per Meter	29.00
12.4.2	225 mm dia	Per Meter	57.00
12.4.3	250 mm dia	Per Meter	60.00
12.4.4	300 mm dia	Per Meter	100.00
12.4.5	350 mm dia	Per Meter	235.00
12.4.6	400 mm dia	Per Meter	256.00
12.4.7	450 mm dia	Per Meter	286.00
12.4.8	500 mm dia	Per Meter	314.00
12.4.9	600 mm dia	Per Meter	392.00
12.4.10	700 mm dia	Per Meter	462.00
12.4.11	800 mm dia	Per Meter	600.00

S NO.	Particulars of Items	Unit	Rate (in Rs.)
12.4.12	900 mm dia	Per Meter	730.00
12.4.13	1000 mm dia	Per Meter	771.00
12.4.14	1100 mm dia	Per Meter	854.00
12.4.15	1200 mm dia	Per Meter	923.00
12.4.16	1400 mm dia	Per Meter	965.00
12.4.17	1600 mm dia	Per Meter	1156.00
12.4.18	1800 mm dia	Per Meter	1383.00
12.5	Providing, Laying and Jointing non-pressure (NP4) RCC socket & spigot pipes with rubber gasket joint including testing of joints.		
12.5.1	150 mm dia	Per Meter	592.00
12.5.2	225 mm dia	Per Meter	578.00
12.5.3	250 mm dia	Per Meter	792.00
12.5.4	300 mm dia	Per Meter	1134.00
12.5.5	350 mm dia	Per Meter	2050.00
12.5.6	400 mm dia	Per Meter	2274.00
12.5.7	450 mm dia	Per Meter	2681.00
12.5.8	500 mm dia	Per Meter	2947.00
12.5.9	600 mm dia	Per Meter	4173.00
12.5.10	700 mm dia	Per Meter	5026.00
12.5.11	800 mm dia	Per Meter	6472.00
12.5.12	900 mm dia	Per Meter	7844.00
12.5.13	1000 mm dia	Per Meter	8418.00
12.5.14	1100 mm dia	Per Meter	9836.00
12.5.15	1200 mm dia	Per Meter	11271.00
12.5.16	1400 mm dia	Per Meter	14347.00
12.5.17	1600 mm dia	Per Meter	16529.00
12.5.18	1800 mm dia	Per Meter	20221.00
12.6	Labour only for Laying and Jointing non-pressure (NP4) RCC socket & spigot pipes with rubber gasket joint including testing of joints.		
12.6.1	150 mm dia	Per Meter	30.00
12.6.2	225 mm dia	Per Meter	64.00
12.6.3	250 mm dia	Per Meter	64.00
12.6.4	300 mm dia	Per Meter	105.00
12.6.5	350 mm dia	Per Meter	242.00
12.6.6	400 mm dia	Per Meter	271.00
12.6.7	450 mm dia	Per Meter	297.00
12.6.8	500 mm dia	Per Meter	325.00
12.6.9	600 mm dia	Per Meter	441.00

S NO.	Particulars of Items	Unit	Rate (in Rs.)
12.6.10	700 mm dia	Per Meter	489.00
12.6.11	800 mm dia	Per Meter	628.00
12.6.12	900 mm dia	Per Meter	730.00
12.6.13	1000 mm dia	Per Meter	784.00
12.6.14	1100 mm dia	Per Meter	854.00
12.6.15	1200 mm dia	Per Meter	943.00
12.6.16	1400 mm dia	Per Meter	981.00
12.6.17	1600 mm dia	Per Meter	1156.00
12.6.18	1800 mm dia	Per Meter	1383.00

12.7	Providing, Laying, Jointing & Testing Half round Reinforced Cement Concrete Pipe NP2, NP3, NP4 type for drains in single row including joint filling with cement mortar 1:2 but excluding excavation, bedding, protection work, backfilling etc. complete		
	i) NP2 Pipes 600mm Dia.	Per Meter	516.00
	ii) NP2 Pipes 500mm Dia.	Per Meter	369.00
	iii) NP2 Pipes 300mm Dia.	Per Meter	230.00
	iv) NP3 Pipes 600mm Dia.	Per Meter	1120.00
	v) NP3 Pipes 500mm Dia.	Per Meter	840.00
	vi) NP3 Pipes 300mm Dia.	Per Meter	480.00
	vii) NP4 Pipes 600mm Dia.	Per Meter	1320.00
	viii) NP4 Pipes 500mm Dia.	Per Meter	980.00
	ix) NP4 Pipes 300mm Dia.	Per Meter	570.00

12.8	Labour for Laying, Jointing & Testing Half round Reinforced Cement Concrete Pipe NP2, NP3, NP4 type for drains in single row including joint filling with cement mortar 1:2 but excluding excavation, bedding, protection work, backfilling etc. complete		
	i) NP2 Pipes 600mm Dia.	Per Meter	206.40
	ii) NP2 Pipes 500mm Dia.	Per Meter	147.60
	iii) NP2 Pipes 300mm Dia.	Per Meter	92.00
	iv) NP3 Pipes 600mm Dia.	Per Meter	448.00
	v) NP3 Pipes 500mm Dia.	Per Meter	336.00
	vi) NP3 Pipes 300mm Dia.	Per Meter	192.00
	vii) NP4 Pipes 600mm Dia.	Per Meter	528.00
	viii) NP4 Pipes 500mm Dia.	Per Meter	392.00
	ix) NP4 Pipes 300mm Dia.	Per Meter	228.00

CHAPTER 13

BAR WRAPPED STEEL CYLINDER PIPES (BWSC)

- 1 Scope
 - 1.1 This specification covers the requirements for design, manufacturing, testing, supplying, laying, jointing, welding and testing at works and site of Bar Wrapped Steel Cylinder (BWSC) Pipes.
- 2 Applicable Codes

IS : 226	Specifications for structural Steel (Standard Quality)
IS: 383	Specifications for coarse and fine aggregates from natural sources for concrete
IS: 432	Specifications for mild steel and medium tensile steel bar/wires for concrete reinforcement
Part 1	Mild Steel and medium tensile steel bar/wires
Part 2	Hard drawn steel wire
IS: 783	Code of Practice for laying of concrete pipes
IS : 1566	Specifications for Hard Drawn Steel Wire for Concrete Reinforcement
IS: 2062	Specifications for Steel for General Structural Purposes
IS: 3597	Methods of Test for Concrete Pipes
IS: 3658	Code of Practice for liquid penetrant flaw detection
IS: 5822	Code of Practice for laying of Electrically Welded Steel Pipes for Water Supply
IS : 7322	Specifications for Specials for Steel Cylinder Reinforced Concrete pipes
IS: 15155	Specifications for Bar Wrapped steel Cylinder Pipes (including Fittings)
AWWA	Manual M-9 Concrete pressure pipe
EN 641	Reinforced Concrete Pressure Pipe, Cylinder Type, including Joints & fittings.
- 2.1 Other I.S. Codes not Specifically mentioned here but pertaining to the use of BWSC pipes form part of these Specifications.
- 3 Design Criteria
 - 3.1 The reinforcement of the pipe shall consist of a welded steel cylinder and bar/wire is directly wrapped under low tension. The average circumferential stress in the steel cylinder and bar/wire reinforcement of the pipe shall be as given below :
 - 3.1.1 At factory test pressure, stress shall not exceed 187 N/mm^2 nor 75 percent of the minimum yield strength of the steel used in the cylinder.
 - 3.1.2 At site test pressure, stress shall not exceed 165 N/mm^2 nor 66 percent of the minimum yield strength of the steel used in the cylinder.
 - 3.1.3 At working pressure, stress shall not exceed 125 N/mm^2 nor 50 percent of the minimum yield strength of the steel used in the cylinder.

- 4 Preparing Pipe Faces for Welding : Before aligning, assembling and welding, the pipe faces shall be cleaned by scrapping by wire brushes or any other method specified by the authority.
- 5 Welding : Generally the welding of pipe in the field should comply with IS 816 : 1969.
- 5.1 For field welding rates applicable for similar welding in M.S. Pipes, shall be adopted.
- 6 Internal Diameter : The internal diameter shall be measured at each end of the pipe at approximately 50mm from the ends. Two measurements of the internal diameter at 90⁰ to each other shall be made at each end and centre. The internal diameter shall be maintained within the tolerance specified.
- 7 Wall Thickness : Measurement of outside circumference of the pipe shall be made at three positions and average outside diameter of the pipe shall be calculated. The inside diameter shall be measured at three positions and average shall be calculated.
- 8 Specials and Fittings
- 8.1 The steel for fabricated steel plate specials, in cut, shaped and welded so that finished special has the required shape and internal dimensions. Adjacent segments are jointed by butt welding. Before lining and coating the welding of special shall be tested by use of hot oil or dye penetrant according to IS 3658 and defects, if any shall be rectified. The steel plate thickness for specials shall be as given in IS 7322.
- 8.2 All the specials shall be tested for hydrostatic pressure as specified for BWSC pipes and to the pressure specified for pipes in the reaches where the specials are fitted.
- 9 For lowering, laying & pouring of cement mortar in the field on joints (after laying & welding) rate as per P.S.C. pipes Lowering, laying & jointing shall be adopted.
- 10 When ever manufacturer is separate and contractor for lowering, laying, jointing & testing is separate the principal contractor shall enter in to agreement with BWSC pipe manufacturer for satisfactory manufacturing, transporting, lowering, laying, jointing and testing of pipe.

11 Measurement:

The net length of pipes as laid or fixed shall be measured in running meters correct to a cm. Specials shall be excluded and measured and paid separately under the relevant item. The portion of the pipe at the joints (inside the joints) shall not be included in the length of pipe work. Excavation, refilling, masonry and concrete work wherever required shall be measured and paid for separately under relevant items of work.

12 Rates

The rate shall include the cost of materials and labour involved in all the operations except for the items measured/ enumerated separately under clause 'Measurements', which shall be paid for separately.

Note : Cement used in the manufacture of Bar Wrapped Steel Cylinder (BWSC) Pipes used in sewerage shall conform to IS 12330 (for sulphate resistant cement)

CHAPTER 13 - BAR WRAPPED STEEL CYLINDER PIPES (BWSC)

Sr. No.	Particulars of Items	Unit	Rate (in
13.1	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 4 kg/Sqcm		
13.1.1	350 mm	RM	2539.00
13.1.2	400 mm	RM	2920.00
13.1.3	450 mm	RM	3340.00
13.1.4	500 mm	RM	3977.00
13.1.5	600 mm	RM	5061.00
13.1.6	700 mm	RM	5959.00
13.1.7	800 mm	RM	6825.00
13.1.8	900 mm	RM	8625.00
13.1.9	1000mm	RM	9925.00
13.1.10	1100mm	RM	14164.00
13.1.11	1200mm	RM	16749.00
13.1.12	1300mm	RM	16711.00
13.1.13	1400mm	RM	18611.00
13.1.14	1500mm	RM	20062.00
13.1.15	1600mm	RM	22954.00
13.2	Labour only for laying, Jointing & testing Bar Wrapped Steel Cylinder Pipes Test Pressure 4 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.2.1	350 mm	RM	457.00
13.2.2	400 mm	RM	526.00
13.2.3	450 mm	RM	601.00
13.2.4	500 mm	RM	716.00
13.2.5	600 mm	RM	810.00
13.2.6	700 mm	RM	953.00
13.2.7	800 mm	RM	1092.00
13.2.8	900 mm	RM	1380.00
13.2.9	1000mm	RM	1390.00
13.2.10	1100mm	RM	1982.00
13.2.11	1200mm	RM	2205.00
13.2.12	1300mm	RM	2340.00
13.2.13	1400mm	RM	2047.00
13.2.14	1500mm	RM	2207.00
13.2.15	1600mm	RM	2525.00

Sr. No.	Particulars of Items	Unit	Rate (in
13.3	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 6 kg/Sqcm		
13.3.1	350 mm	RM	2544.00
13.3.2	400 mm	RM	2931.00
13.3.3	450 mm	RM	3356.00
13.3.4	500 mm	RM	3995.00
13.3.5	600 mm	RM	5086.00
13.3.6	700 mm	RM	5977.00
13.3.7	800 mm	RM	6844.00
13.3.8	900 mm	RM	8634.00
13.3.9	1000mm	RM	9950.00
13.3.10	1100mm	RM	14164.00
13.3.11	1200mm	RM	16764.00
13.3.12	1300mm	RM	16731.00
13.3.13	1400mm	RM	18626.00
13.3.14	1500mm	RM	20082.00
13.3.15	1600mm	RM	22974.00
13.4	Labour only for laying, Jointing & Testing Bar Wrapped Steel Cylinder Pipes Test Pressure 6 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.4.1	350 mm	RM	457.00
13.4.2	400 mm	RM	528.00
13.4.3	450 mm	RM	604.00
13.4.4	500 mm	RM	719.00
13.4.5	600 mm	RM	814.00
13.4.6	700 mm	RM	956.00
13.4.7	800 mm	RM	1095.00
13.4.8	900 mm	RM	1381.00
13.4.9	1000mm	RM	1393.00
13.4.10	1100mm	RM	1983.00
13.4.11	1200mm	RM	2207.00
13.4.12	1300mm	RM	2342.00
13.4.13	1400mm	RM	2049.00
13.4.14	1500mm	RM	2209.00
13.4.15	1600mm	RM	2527.00
13.5	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 8 kg/Sqcm		
13.5.1	350 mm	RM	2547.00
13.5.2	400 mm	RM	2951.00
13.5.3	450 mm	RM	3374.00
13.5.4	500 mm	RM	4017.00
13.5.5	600 mm	RM	5111.00
13.5.6	700 mm	RM	5998.00

Sr. No.	Particulars of Items	Unit	Rate (in
13.5.7	800 mm	RM	6866.00
13.5.8	900 mm	RM	8641.00
13.5.9	1000mm	RM	9976.00
13.5.10	1100mm	RM	14179.00
13.5.11	1200mm	RM	16784.00
13.5.12	1300mm	RM	16756.00
13.5.13	1400mm	RM	18645.00
13.5.14	1500mm	RM	20104.00
13.5.15	1600mm	RM	22996.00
13.6	Labour only for laying, Jointing & Testing Bar Wrapped Steel Cylinder Pipes Test Pressure 8 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.6.1	350 mm	RM	458.00
13.6.2	400 mm	RM	531.00
13.6.3	450 mm	RM	607.00
13.6.4	500 mm	RM	723.00
13.6.5	600 mm	RM	818.00
13.6.6	700 mm	RM	960.00
13.6.7	800 mm	RM	1099.00
13.6.8	900 mm	RM	1383.00
13.6.9	1000mm	RM	1397.00
13.6.10	1100mm	RM	1985.00
13.6.11	1200mm	RM	2210.00
13.6.12	1300mm	RM	2346.00
13.6.13	1400mm	RM	2051.00
13.6.14	1500mm	RM	2211.00
13.6.15	1600mm	RM	2530.00
13.7	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 10 kg/Sqcm		
13.7.1	350 mm	RM	2549.00
13.7.2	400 mm	RM	2976.00
13.7.3	450 mm	RM	3396.00
13.7.4	500 mm	RM	4042.00
13.7.5	600 mm	RM	5139.00
13.7.6	700 mm	RM	6023.00
13.7.7	800 mm	RM	6891.00
13.7.8	900 mm	RM	8647.00
13.7.9	1000mm	RM	10006.00
13.7.10	1100mm	RM	14199.00
13.7.11	1200mm	RM	16809.00
13.7.12	1300mm	RM	16781.00
13.7.13	1400mm	RM	18670.00
13.7.14	1500mm	RM	20129.00

Sr. No.	Particulars of Items	Unit	Rate (in
13.7.15	1600mm	RM	23021.00
14.8	Labour only for laying, Jointing & testing Bar Wrapped Steel Cylinder Pipes Test Pressure 10 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.8.1	350 mm	RM	459.00
13.8.2	400 mm	RM	536.00
13.8.3	450 mm	RM	611.00
13.8.4	500 mm	RM	728.00
13.8.5	600 mm	RM	822.00
13.8.6	700 mm	RM	964.00
13.8.7	800 mm	RM	1103.00
13.8.8	900 mm	RM	1384.00
13.8.9	1000mm	RM	1401.00
13.8.10	1100mm	RM	1988.00
13.8.11	1200mm	RM	2213.00
13.8.12	1300mm	RM	2349.00
13.8.13	1400mm	RM	2054.00
13.8.14	1500mm	RM	2214.00
13.8.15	1600mm	RM	2532.00
13.9	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 12 kg/Sqcm		
13.9.1	350 mm	RM	2552.00
13.9.2	400 mm	RM	3004.00
13.9.3	450 mm	RM	3422.00
13.9.4	500 mm	RM	4070.00
13.9.5	600 mm	RM	5169.00
13.9.6	700 mm	RM	6052.00
13.9.7	800 mm	RM	7249.00
13.9.8	900 mm	RM	8659.00
13.9.9	1000mm	RM	10487.00
13.9.10	1100mm	RM	14224.00
13.9.11	1200mm	RM	16834.00
13.9.12	1300mm	RM	16807.00
13.9.13	1400mm	RM	18700.00
13.9.14	1500mm	RM	21726.00
13.9.15	1600mm	RM	24097.00

Sr. No.	Particulars of Items	Unit	Rate (in
13.10	Labour only for laying, Jointing & Testing Bar Wrapped Steel Cylinder Pipes Test Pressure 12 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.10.1	350 mm	RM	459.00
13.10.2	400 mm	RM	541.00
13.10.3	450 mm	RM	616.00
13.10.4	500 mm	RM	733.00
13.10.5	600 mm	RM	827.00
13.10.6	700 mm	RM	968.00
13.10.7	800 mm	RM	1160.00
13.10.8	900 mm	RM	1385.00
13.10.9	1000mm	RM	1468.00
13.10.10	1100mm	RM	1991.00
13.10.11	1200mm	RM	2217.00
13.10.12	1300mm	RM	2353.00
13.10.13	1400mm	RM	2057.00
13.10.14	1500mm	RM	2390.00
13.10.15	1600mm	RM	2651.00
13.11	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 14 kg/Sqcm		
13.11.1	350 mm	RM	2555.00
13.11.2	400 mm	RM	3026.00
13.11.3	450 mm	RM	3507.00
13.11.4	500 mm	RM	4114.00
13.11.5	600 mm	RM	5220.00
13.11.6	700 mm	RM	6600.00
13.11.7	800 mm	RM	8457.00
13.11.8	900 mm	RM	9439.00
13.11.9	1000mm	RM	11724.00
13.11.10	1100mm	RM	14284.00
13.11.11	1200mm	RM	16063.00
13.11.12	1300mm	RM	17788.00
13.11.13	1400mm	RM	20571.00
13.11.14	1500mm	RM	23125.00
13.11.15	1600mm	RM	28751.00

Sr. No.	Particulars of Items	Unit	Rate (in
13.12	Labour only for laying, Jointing & Testing Bar Wrapped Steel Cylinder Pipes Test Pressure 14 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.12.1	350 mm	RM	460.00
13.12.2	400 mm	RM	545.00
13.12.3	450 mm	RM	631.00
13.12.4	500 mm	RM	741.00
13.12.5	600 mm	RM	835.00
13.12.6	700 mm	RM	1056.00
13.12.7	800 mm	RM	1353.00
13.12.8	900 mm	RM	1610.00
13.12.9	1000mm	RM	1641.00
13.12.10	1100mm	RM	2000.00
13.12.11	1200mm	RM	2249.00
13.12.12	1300mm	RM	2490.00
13.12.13	1400mm	RM	2263.00
13.12.14	1500mm	RM	2544.00
13.12.15	1600mm	RM	3163.00
13.13	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 16 kg/Sqcm		
13.13.1	350 mm	RM	2560.00
13.13.2	400 mm	RM	3051.00
13.13.3	450 mm	RM	3640.00
13.13.4	500 mm	RM	4466.00
13.13.5	600 mm	RM	5684.00
13.13.6	700 mm	RM	7242.00
13.13.7	800 mm	RM	8878.00
13.13.8	900 mm	RM	10203.00
13.13.9	1000mm	RM	11849.00
13.13.10	1100mm	RM	16269.00
13.13.11	1200mm	RM	17862.00
13.13.12	1300mm	RM	19423.00
13.13.13	1400mm	RM	22968.00
13.13.14	1500mm	RM	25941.00
13.13.15	1600mm	RM	29478.00

Sr. No.	Particulars of Items	Unit	Rate (in
13.14	Labour only for laying, Jointing & Testing Bar Wrapped Steel Cylinder Pipes Test Pressure 16 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.14.1	350 mm	RM	461.00
13.14.2	400 mm	RM	549.00
13.14.3	450 mm	RM	655.00
13.14.4	500 mm	RM	804.00
13.14.5	600 mm	RM	909.00
13.14.6	700 mm	RM	1169.00
13.14.7	800 mm	RM	1420.00
13.14.8	900 mm	RM	1632.00
13.14.9	1000mm	RM	1659.00
13.14.10	1100mm	RM	2138.00
13.14.11	1200mm	RM	2501.00
13.14.12	1300mm	RM	2719.00
13.14.13	1400mm	RM	2526.00
13.14.14	1500mm	RM	2854.00
13.14.15	1600mm	RM	3243.00
13.15	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 18 kg/Sqcm		
13.15.1	350 mm	RM	2565.00
13.15.2	400 mm	RM	3091.00
13.15.3	450 mm	RM	3716.00
13.15.4	500 mm	RM	4623.00
13.15.5	600 mm	RM	5938.00
13.15.6	700 mm	RM	7563.00
13.15.7	800 mm	RM	9545.00
13.15.8	900 mm	RM	10709.00
13.15.9	1000mm	RM	12523.00
13.15.10	1100mm	RM	16012.00
13.15.11	1200mm	RM	18768.00
13.15.12	1300mm	RM	20885.00
13.15.13	1400mm	RM	24316.00
13.15.14	1500mm	RM	27234.00
13.15.15	1600mm	RM	32045.00

Sr. No.	Particulars of Items	Unit	Rate (in
13.16	Labour only for laying, Jointing & Testing Bar Wrapped Steel Cylinder Pipes Test Pressure 18 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.16.1	350 mm	RM	462.00
13.16.2	400 mm	RM	556.00
13.16.3	450 mm	RM	669.00
13.16.4	500 mm	RM	832.00
13.16.5	600 mm	RM	950.00
13.16.6	700 mm	RM	1210.00
13.16.7	800 mm	RM	1627.00
13.16.8	900 mm	RM	1713.00
13.16.9	1000mm	RM	1753.00
13.16.10	1100mm	RM	2242.00
13.16.11	1200mm	RM	2628.00
13.16.12	1300mm	RM	2924.00
13.16.13	1400mm	RM	2675.00
13.16.14	1500mm	RM	2996.00
13.16.15	1600mm	RM	3525.00
13.17	Providing and supplying Bar Wrapped Steel Cylinder Pipes Test Pressure 20 kg/Sqcm		
13.17.1	350 mm	RM	2591.00
13.17.2	400 mm	RM	3148.00
13.17.3	450 mm	RM	3889.00
13.17.4	500 mm	RM	4975.00
13.17.5	600 mm	RM	6401.00
13.17.6	700 mm	RM	8205.00
13.17.7	800 mm	RM	10341.00
13.17.8	900 mm	RM	11773.00
13.17.9	1000mm	RM	13725.00
13.17.10	1100mm	RM	17638.00
13.17.11	1200mm	RM	20619.00
13.17.12	1300mm	RM	23002.00
13.17.13	1400mm	RM	26437.00
13.17.14	1500mm	RM	29748.00
13.17.15	1600mm	RM	34471.00

Sr. No.	Particulars of Items	Unit	Rate (in
13.18	Labour only for laying, Jointing & Testing Bar Wrapped Steel Cylinder Pipes Test Pressure 20 kg/Sqcm including cost of jointing material as per relevant IS specification.		
13.18.1	350 mm	RM	466.00
13.18.2	400 mm	RM	567.00
13.18.3	450 mm	RM	700.00
13.18.4	500 mm	RM	896.00
13.18.5	600 mm	RM	1024.00
13.18.6	700 mm	RM	1313.00
13.18.7	800 mm	RM	1655.00
13.18.8	900 mm	RM	1884.00
13.18.9	1000mm	RM	1922.00
13.18.10	1100mm	RM	2469.00
13.18.11	1200mm	RM	2887.00
13.18.12	1300mm	RM	3220.00
13.18.13	1400mm	RM	2908.00
13.18.14	1500mm	RM	3272.00
13.18.15	1600mm	RM	3792.00

CHAPTER- 14

Sluice Gate and Valves

- 1 Single faced sluice gates are extensively used in water supply and drainage works for controlling the flow. The users do not have, at present, any standards on which they can base their requirements. IS 3042 -1965 (reaffirmed 2003) is intended to fulfil the need, gives the dimensions, materials and constructional requirements for different classes of single faced sluice gate from 200 to 1200 mm sizes
- 2 Sluice valves for water works purposes (50 to 1200 mm size) shall be as per IS 14846:2000 - 2000 (Reaffirmation year 2015) duly inspected and tested and having BIS certification mark.
- 3 Butterfly valves for General purpose shall be as per IS 13095 - 1991(Reaffirmation year 2018) duly inspected and tested and having BIS certification mark.
- 4 Installation and maintenance of sluice valves shall be as per IS 2685 - 1971.(Reaffirmation year 2017)
- 5 Swing check Type Reflux(non- return) valves shall be as per IS 5312 : (Part 1-single door pattern) 2004(Reaffirmation year 2019), IS 5312 : (Part 2-multidoor pattern) : 2013(Reaffirmation year 2018) duly inspected and tested and having BIS certification mark.
- 6 For Air valve & shall be as per IS 14845 - 2000 (Reaffirmation year 2015) duly inspected and tested and having BIS certification mark.
- 7 All Joints shall conform to relevant Indian Standards.
- 8 Marking & testing
 - (i) The standard marking and packing of the valves shall be done as per IS : 14846. The direction of rotation for OPEN, CLOSE position shall be marked on the hand wheel and on the bonnet of the valve.
 - (ii) Testing of sluice valve should be done for close end in accordance with IS : 14846.
 - (iii) All the valves should be inspected for flaw detection test in accordance with the IS: 14846.
- 9
 - (i) All grit and foreign matters are removed from the inside of the valves before placing in pipes.
 - (ii) All the four faces are thoroughly cleaned and coated with a thin layer of mineral grease.

(iii) It is important to check tightening of gland with a pair of inside calipers. Clearance between the top of the stuffing box and the underside of the gland should be uniform on all the sides.

10 Fixing means laying in specified position to ensure interconnection between all flanged pipes, fittings and valves. It is also to ensure that the bolt holes of two flanges of the pipe/ fittings are correctly aligned.

11 Cast Iron Sluice Gate as per IS-13349.

11.1 APPLICATION:

Wall thimble mounted Sluice gates are used either for isolation of flow from a sump / chamber to a closed conduit or to another sump / chamber or for isolation of flow from a conduit to a sump / chamber. Standard sluice gates have to be modified to make them suitable for modulation application and hence standard sluice gates should not be used for modulation application.

11.2 SALIENT FEATURES:

11.2.1 Flange back frame gate suitable for mounting on the face of a Cast iron Wall thimble using studs and with a gasket between gate frame and wall thimble flange.

11.2.2 Wall thimble to have cross section "F" and depth of 150 mm for the gate size up to and including 600 mm and depth of 300 mm for the gate size above 600 mm unless until specified otherwise. Gates having square / rectangular opening to be provided with thimble having square/ rectangular opening aperture with square / rectangular flange for gate frame mounting.

11.2.3 Square shaped natural rubber Gasket with predrilled holes for positioning in between machined face of wall thimble flange and frame flange.

11.2.4 Open top frame provided with short length extension guides to support ½ vertical height of the slide when the slide is in full open position.

11.2.5 Frame specially designed to permit front access for tightening of thimble mounting nuts so as to enable mounting of gates side by side or near corners.

11.2.6 Rigid shutter designed to withstand the applicable water head. Shutter to be provided with cast integral pocket to house the stem-connecting block, which connects the spindle to the shutter for up and down operation.

11.2.7 Seat facing fitted on machined Plain Surface of frame and shutter-using counter sunk screws for better fitments.

11.2.8 Rising stem / spindle to suit the distance between centerline of gate opening and top of operating platform as stated below in price schedule. The spindle is provided with square / trapezoidal threading with the threaded length being approximately 400mm more than the height of waterway opening.

11.2.9 Operation of gates by means of manual lift mechanism comprise of pillar mounted geared gate operating mechanism suitable for opening / closing of gate by a single person with an effort not exceeding 20 Kgs on the hand wheel / crank handle.

11.2.10 Economical and faster erection due to flange back design.

12 Measurement

- (a) All measurements should be of the finished work
- (b) C.I. Pipes/ Valves are designated by Inner diameter.

13 Rates

(i) The rates include all tools and plants, chain pulley block, other appliances etc. required for lifting and laying the valves in position as per approved drawings.

(ii) The rates include provision and use of all coverings etc. to protect, the works from inclement weather etc. from damaging by fall of materials and due to other causes.

(iii) The rates include provision of handling and storing under cover as required and returning of empty cases or containers if any to the local body stores without any extra cost, for such materials as may be supplied by the department.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 14 - Sluice Gate and Valves

S.No	Particulars of Items	Unit	Rate (in Rs.)
A	Sluice Gate		
14.1	Providing and supply of Cast Iron Sluice Gate Square type as per IS-13349 duly tested inclusive of all taxes related to central, state and municipal, inclusive of excise duty, inspection charges, transportation charges, transit insurance, loading/ unloading and stacking at site/ store etc, complete.		
14.1.1	Sluice Gate Square type as per IS 13349, Size 300 X 300 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	125500.00
14.1.2	Sluice Gate Square type as per IS 13349, Size 400 X 400 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	146000.00
14.1.3	Sluice Gate Square type as per IS 13349, Size 500X500 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	168500.00
14.1.4	Sluice Gate Square type as per IS 13349, Size 600X600 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	192500.00
14.1.5	Sluice Gate Square type as per IS 13349, Size 700X700 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	272500.00
14.1.6	Sluice Gate Square type as per IS 13349, Size 800X800 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	301750.00
14.1.7	Sluice Gate Square type as per IS 13349, Size 900X900 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	329000.00
14.1.8	Sluice Gate Square type as per IS 13349, Size 1000X1000 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	382000.00
14.1.9	Sluice Gate Square type as per IS 13349, Size 1100X1100 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	405500.00
14.1.10	Sluice Gate Square type as per IS 13349, Size 1200X1200 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.5 Meter, Class – I, Flush Bottom Closure	Each	457500.00
14.1.11	Sluice Gate Square type as per IS 13349, Size 1300X1300 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	572250.00
14.1.12	Sluice Gate Square type as per IS 13349, Size 1400X1400 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	656500.00
14.1.13	Sluice Gate Square type as per IS 13349, Size 1500X1500 mm. Cast Iron Wall Thimble mounted, Manually operated, CL-PL : 5.50 Meter, Class – I, Flush Bottom Closure	Each	719000.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
B	Valves			
(i)	Sluice Valves			
	Cast Iron Valves			
14.2	Providing & fixing of Cast iron double flanged sluice valves as per I.S.:14846-2000 fitted with cast iron cap including jointing & testing with cost of jointing material such as bolts, nuts, rubber insertions etc. all complete		PN-1.0	PN-1.6
14.2.1	50mm dia	Each	2317.00	3142.00
14.2.2	65mm dia	Each	2801.00	3398.00
14.2.3	80mm dia	Each	3116.00	3822.00
14.2.4	100mm dia	Each	4153.00	5227.00
14.2.5	125mm dia	Each	5570.00	5872.00
14.2.6	150mm dia	Each	6747.00	8258.00
14.2.7	200mm dia	Each	11243.00	13748.00
14.2.8	250 mm dia	Each	19514.00	20163.00
14.2.9	300mm dia	Each	22072.00	28449.00
14.2.10	350 mm dia	Each	45400.00	58516.00
14.2.11	400 mm dia	Each	58000.00	74756.00
14.2.12	450 mm dia	Each	71400.00	92027.00
14.2.13	500 mm dia	Each	89400.00	115228.00
14.2.14	600 mm dia	Each	131800.00	169877.00
14.2.15	700 mm dia	Each	246500.00	317714.00
14.2.16	750 mm dia	Each	274300.00	353545.00
14.2.17	800 mm dia	Each	333600.00	429977.00
14.2.18	900 mm dia	Each	436600.00	562734.00
14.2.19	1000 mm dia	Each	670400.00	864079.00
14.3	Fixing including Jointing of Cast iron double flanged sluice valves fitted with cast iron cap testing with cost of jointing material such as bolts, nuts, rubber insertions etc. all complete (only valve to be supplied by the department free of cost).		PN-1.0	PN-1.6
14.3.1	50mm dia	Each	160.00	160.00
14.3.2	65mm dia	Each	174.00	174.00
14.3.3	80mm dia	Each	179.00	179.00
14.3.4	100mm dia	Each	291.00	291.00
14.3.5	125mm dia	Each	312.00	312.00
14.3.6	150mm dia	Each	347.00	347.00
14.3.7	200mm dia	Each	617.00	617.00
14.3.8	250mm dia	Each	738.00	738.00
14.3.9	300mm dia	Each	847.00	847.00
14.3.10	350 mm dia	Each	1262.00	1262.00
14.3.11	400 mm dia	Each	1447.00	1447.00
14.3.12	450 mm dia	Each	1746.00	1746.00
14.3.13	500 mm dia	Each	2031.00	2031.00
14.3.14	600 mm dia	Each	3245.00	3245.00
14.3.15	700 mm dia	Each	3512.00	3512.00
14.3.16	750 mm dia	Each	3736.00	3736.00
14.3.17	800 mm dia	Each	4839.00	4839.00
14.3.18	900 mm dia	Each	4978.00	4978.00
14.3.19	1000 mm dia	Each	5148.00	5148.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.4	Labour for laying and fixing of cast iron double flanged sluice valves including jointing and testing but without cost of Jointing materials.		PN-1.0	PN-1.6
14.4.1	50mm dia	Each	57.00	57.00
14.4.2	65mm dia	Each	64.00	64.00
14.4.3	80mm dia	Each	68.00	68.00
14.4.4	100mm dia	Each	85.00	85.00
14.4.5	125mm dia	Each	102.00	102.00
14.4.6	150mm dia	Each	126.00	126.00
14.4.7	200mm dia	Each	197.00	197.00
14.4.8	250mm dia	Each	281.00	281.00
14.4.9	300mm dia	Each	371.00	371.00
14.4.10	350mm dia	Each	643.00	643.00
14.4.11	400mm dia	Each	779.00	779.00
14.4.12	450mm dia	Each	873.00	873.00
14.4.13	500mm dia	Each	1104.00	1104.00
14.4.14	600mm dia	Each	1711.00	1711.00
14.4.15	700mm dia	Each	1971.00	1971.00
14.4.16	750mm dia	Each	2043.00	2043.00
14.4.17	800mm dia	Each	2332.00	2332.00
14.4.18	900mm dia	Each	2476.00	2476.00
14.4.19	1000mm dia	Each	2621.00	2621.00
14.5	Providing and fixing of cast iron plain ended sluice valves as per IS : 14846-2000 fitted with cast iron cap including jointing and testing with cost of jointing material C.I. detachable joints conforming to IS 8794/1988 with bolts, nuts and rubber rings conforming to IS 5382/85 & IS-10292/88 (Class 10) all complete.		PN- 1.0	
14.5.1	80mm dia	Each	3432.00	
14.5.2	100mm dia	Each	4571.00	
14.5.3	150mm dia	Each	7510.00	
14.5.4	200mm dia	Each	12445.00	
14.5.5	300mm dia	Each	24000.00	
14.6	Providing, Fixing, jointing & testing double flange sluice valve conforming to IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, all complete.		PN- 1.0	PN-1.6
14.6.1	a) without bypass arrangement			
14.6.1.1	50mm dia	Each	3923.00	4917.00
14.6.1.2	65mm dia	Each	4641.00	5800.00
14.6.1.3	80mm dia	Each	4796.00	6316.00
14.6.1.4	100mm dia	Each	6388.00	8416.00
14.6.1.5	125mm dia	Each	7989.00	10515.00
14.6.1.6	150mm dia	Each	9580.00	11152.00
14.6.1.7	200mm dia	Each	17365.00	21711.00
14.6.1.8	250mm dia	Each	26848.00	33569.00
14.6.1.9	300mm dia	Each	34085.00	42629.00
14.6.1.10	350mm dia	Each	50141.00	64910.00
14.6.1.11	400mm dia	Each	66014.00	82403.00
14.6.1.12	450mm dia	Each	70972.00	101829.00
14.6.1.13	500mm dia	Each	102290.00	127794.00
14.6.1.14	600mm dia	Each	151547.00	189388.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.6.1.15	700mm dia	Each	281691.00	286861.00
14.6.1.16	750mm dia	Each	319114.00	319904.00
14.6.1.17	800mm dia	Each	389272.00	390235.00
14.6.1.18	900mm dia	Each	510436.00	511699.00
14.6.1.19	1000mm dia	Each	763408.00	789331.00
14.6.1.20	1100mm dia	Each	978703.00	981127.00
14.6.1.21	1200mm dia	Each	1157135.00	1159998.00
14.6.2	b) with bypass arrangement		PN- 1.0	PN-1.6
14.6.2.1	50mm dia	Each	4117.00	5442.00
14.6.2.2	65mm dia	Each	4651.00	5811.00
14.6.2.3	80mm dia	Each	4796.00	6327.00
14.6.2.4	100mm dia	Each	6388.00	8432.00
14.6.2.5	125mm dia	Each	7989.00	10530.00
14.6.2.6	150mm dia	Each	10089.00	12610.00
14.6.2.7	200mm dia	Each	17397.00	21742.00
14.6.2.8	250mm dia	Each	26879.00	33601.00
14.6.2.9	300mm dia	Each	34115.00	42659.00
14.6.2.10	350mm dia	Each	52005.00	65006.00
14.6.2.11	400mm dia	Each	66112.00	82526.00
14.6.2.12	450mm dia	Each	81511.00	101980.00
14.6.2.13	500mm dia	Each	102443.00	127983.00
14.6.2.14	600mm dia	Each	151771.00	189670.00
14.6.2.15	700mm dia	Each	286437.00	287216.00
14.6.2.16	750mm dia	Each	319431.00	320299.00
14.6.2.17	800mm dia	Each	389656.00	390718.00
14.6.2.18	900mm dia	Each	510941.00	512332.00
14.6.2.19	1000mm dia	Each	775059.00	790305.00
14.6.2.20	1100mm dia	Each	979672.00	982337.00
14.6.2.21	1200mm dia	Each	1158240.00	1161432.00
	Ductile Iron Valves			
14.7	Providing & fixing of following Ductile iron double flanged sluice valves as per IS:14846- 2000 fitted with cap including jointing & testing with cost of jointing material such as bolts, nuts, rubber insertions etc. all complete.		Non Rising Spindle (CLASS PN- 1.6)	Rising Spindle (CLASS PN- 1.6)
14.7.1	80mm dia	Each	8504.00	11003.00
14.7.2	100mm dia	Each	11431.00	14797.00
14.7.3	150mm dia	Each	17071.00	22082.00
14.7.4	200mm dia	Each	32563.00	42169.00
14.7.5	250mm dia	Each	46700.00	60491.00
14.7.6	300mm dia	Each	58576.00	75799.00
14.7.7	350mm dia	Each	112389.00	145540.00
14.7.8	400mm dia	Each	135715.00	175838.00
14.7.9	450mm dia	Each	159269.00	206202.00
14.7.10	500mm dia	Each	298442.00	387078.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.8	Providing & fixing of following Ductile iron double flanged sluice valves glandless, resilient (soft seated) non-rising spindle with body bonnet of ductile iron of grade GGG 40/SGL 400/12 or equivalent grade or of higher tensile strength grade, as per IS: 3896 part-II-1986 and subsequent revision, wedge fully rubber lined with EPDM food grade quality and seals of NBR. The valve should be with replaceable nut and replaceable sliding shoes, valve stems shall be of single piece thread rolled. Sluice valve shall be suitable for buried applications without valve chambers. The valve should be vacuum tight and 100% leakproof with face to face dimensions as BS: 5163-89/ IS: 14846/2000/DIN 3204 F4 and flange connections as per IS: 1538. Valve should be with electrostatic powder coating both inside and outside (thickness 250 micron) with pocketless straight through body passage including jointing and testing with cost of jointing material such as bolts, nuts, rubber insertions etc. all complete.		CLASS PN- 1.0	CLASS PN- 1.6
14.8.1	100mm dia	Each	8386.00	8386.00
14.8.2	150mm dia	Each	14379.00	14379.00
14.8.3	200mm dia	Each	21374.00	21385.00
14.8.4	250mm dia	Each	35229.00	35229.00
14.8.5	300mm dia	Each	45616.00	45616.00
14.8.6	350mm dia	Each	89479.00	98599.00
14.8.7	400mm dia	Each	93406.00	101186.00
14.8.8	450mm dia	Each	285275.00	285275.00
14.8.9	500mm dia	Each	294019.00	294019.00
14.8.10	600mm dia	Each	369151.00	369151.00
14.9	Labour for laying and fixing of following Ductile iron double flanged sluice valves glandless, resilient (soft seated) non-rising spindle with body bonnet of ductile iron of grade GGG 40/SGL 400/12 or equivalent grade or of higher tensile strength grade, as per IS: 3896 part-II-1986 and subsequent revision, wedge fully rubber lined with EPDM food grade quality and seals of NBR. The valve should be with replaceable nut and replaceable sliding shoes, valve stems shall be of single piece thread rolled. Sluice valve shall be suitable for buried applications without valve chambers. The valve should be vacuum tight and 100% leakproof with face to face dimensions as BS: 5163-89/ IS: 14846/2000/DIN 3204 F4 and flange connections as per IS: 1538. Valve should be with electrostatic powder coating both inside and outside (thickness 250 micron) with pocketless straight through body passage including jointing and testing with cost of jointing material such as bolts, nuts, rubber insertions etc. all complete.		CLASS PN- 1.0	CLASS PN- 1.6
14.9.1	100mm dia	Each	112.00	112.00
14.9.2	150mm dia	Each	161.00	161.00
14.9.3	200mm dia	Each	232.00	232.00
14.9.4	250mm dia	Each	330.00	330.00
14.9.5	300mm dia	Each	420.00	420.00
14.9.6	350mm dia	Each	706.00	706.00
14.9.7	400mm dia	Each	842.00	842.00
14.9.8	450mm dia	Each	949.00	949.00
14.9.9	500mm dia	Each	1181.00	1181.00
14.9.10	600mm dia	Each	1807.00	1807.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.10	Providing, fixing, jointing, supplying & Testing at site of ductile iron / spheroidal graphite (S.G.) iron D/F non-rising spindle resilient seated glandless sluice valves with handwheel & without bypass arrangement. Valves in accordance with BS 5163 of PN-10/ 16 rated, with body and bonnet of ductile iron confirming to IS 1865 Gr. 500/7 or Gr.400/15. Wedge fully encapsulated WRAS approved EPDM rubber (approved for drinking water), Wedge nut of brass, shaft of stainless steel 1.4021/1.4104, stem seals min. 3 nos. of NBR, internal fasteners of stainless steel A2. Body & Bonnet coated inside & outside with electrostatically applied epoxy powder coated blue colour (suitable for drinking water) as per DIN 30677-2 & GSK guidelines with a coating thickness of min. 250 microns. Valves should be full bore & tight shut-off. Flange drilling as per IS 1538 raised face & pressure testing at manufacturer's works shall be done as per IS 14846. all complete. (For PN 10 & 16)		CLASS PN- 1.0 / PN- 1.6	
14.10.1	50mm dia	Each	10251.00	
14.10.2	80mm dia	Each	13017.00	
14.10.3	100mm dia	Each	16127.00	
14.10.4	150mm dia	Each	22495.00	
14.10.5	200mm dia	Each	35702.00	
14.10.6	250mm dia	Each	63251.00	
14.10.7	300mm dia	Each	84787.00	
14.10.8	350mm dia	Each	194052.00	
14.10.9	400mm dia	Each	234160.00	
14.10.10	450mm dia	Each	319957.00	
14.10.11	500mm dia	Each	404064.00	
14.10.12	600mm dia	Each	584595.00	
	Cast Steel / Spheroidal Graphite (S.G.) Iron			
14.11	Providing, erecting & testing Cast Steel/ Spheroidal Graphite (S.G) Iron D/F Sluice Valves with jointing to pipe work (including all hardware and packing) water works quality, having non-rising spindle with hand wheel and without bypass arrangement, spindle of stainless steel as per requirement, all complete.		Rating Class 150 (Working Pressure 20 kg/cm ² and Test Pressure 30 kg/cm ²) CS-150	Rating Class 300 (Working Pressure 52 kg/cm ² and Test Pressure 78 kg/cm ²) CS-300
14.11.1	80mm dia	Each	14124.00	15203.00
14.11.2	100mm dia	Each	18831.00	24003.00
14.11.3	150mm dia	Each	28247.00	36596.00
14.11.4	200mm dia	Each	44053.00	57395.00
14.11.5	250mm dia	Each	63396.00	61956.00
14.11.6	300mm dia	Each	81115.00	104445.00
14.11.7	350mm dia	Each	108154.00	176149.00
14.11.8	400mm dia	Each	180478.00	256971.00
14.11.9	450mm dia	Each	246243.00	309395.00
14.11.10	500mm dia	Each	289697.00	482009.00
14.11.11	600mm dia	Each	330736.00	728543.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
(ii)	Non-Return Valve		
	Cast Iron		
14.12	Providing & fixing cast iron double flanged single door reflux (non return) valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		PN- 1.0
14.12.1	50mm dia	Each	1343.00
14.12.2	65mm dia	Each	1766.00
14.12.3	80mm dia	Each	2116.00
14.12.4	100mm dia	Each	3033.00
14.12.5	150mm dia	Each	4913.00
14.12.6	200mm dia	Each	8801.00
14.12.7	250mm dia	Each	12615.00
14.12.8	300mm dia	Each	17352.00
14.12.9	350mm dia	Each	37935.00
14.13	Providing & fixing cast iron double flanged multi door reflux (non return) valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete		PN- 1.0
14.13.1	400mm dia	Each	95930.00
14.13.2	450mm dia	Each	106084.00
14.13.3	500mm dia	Each	161998.00
14.13.4	600mm dia	Each	255215.00
14.13.5	700mm dia	Each	383094.00
14.13.6	750mm dia	Each	468065.00
14.13.7	800mm dia	Each	540744.00
14.14	Labour for laying and fixing of Cast Iron Double Flanged reflux (non return) valves including jointing & testing but without cost and jointing materials.		PN- 1.0
14.14.1	50mm dia	Each	57.00
14.14.2	65mm dia	Each	64.00
14.14.3	80mm dia	Each	68.00
14.14.4	100mm dia	Each	84.00
14.14.5	125mm dia	Each	102.40
14.14.6	150mm dia	Each	126.00
14.14.7	200mm dia	Each	197.00
14.14.8	250mm dia	Each	281.00
14.14.9	300mm dia	Each	371.00
14.14.10	350mm dia	Each	570.00
14.14.11	400mm dia	Each	779.00
14.14.12	450mm dia	Each	873.00
14.14.13	500mm dia	Each	1104.00
14.14.14	600mm dia	Each	1711.00
14.14.15	700mm dia	Each	1971.00
14.14.16	750mm dia	Each	2043.00
14.14.17	800mm dia	Each	2260.00
14.14.18	900 mm dia	Each	2476.00
14.14.19	1000mm dia	Each	2621.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.15	Providing, supplying, fixing & testing ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking, etc. all complete.		PN-1.0	PN-1.6
14.15.1	a) without by pass arrangement			
14.15.1.1	50mm dia	Each	3102.00	-
14.15.1.2	65mm dia	Each	3631.00	-
14.15.1.3	80mm dia	Each	3824.00	-
14.15.1.4	100mm dia	Each	5339.00	-
14.15.1.5	125mm dia	Each	7623.00	-
14.15.1.6	150mm dia	Each	9230.00	-
14.15.1.7	200mm dia	Each	16590.00	-
14.15.1.8	250mm dia	Each	28312.00	36554.00
14.15.1.9	300mm dia	Each	38794.00	49420.00
14.15.1.10	350mm dia	Each	60343.00	75429.00
14.15.1.11	400mm dia	Each	71777.00	89722.00
14.15.1.12	450mm dia	Each	103211.00	119948.00
14.15.1.13	500mm dia	Each	152929.00	191160.00
14.15.1.14	600mm dia	Each	187271.00	234088.00
14.15.1.15	700mm dia	Each	-	345994.00
14.15.1.16	750mm dia	Each	-	397187.00
14.15.1.17	800mm dia	Each	-	451912.00
14.15.1.18	900 mm dia	Each	-	571949.00
14.15.1.19	1000mm dia	Each	-	706111.00
14.15.1.20	1100mm dia	Each	-	854392.00
14.15.1.21	1200mm dia	Each	-	1017173.00
14.15.2	b) with by pass arrangement		PN-1.0	PN-1.6
14.15.2.1	80mm dia	Each	4415.00	-
14.15.2.2	100mm dia	Each	6290.00	-
14.15.2.3	125mm dia	Each	8565.00	-
14.15.2.4	150mm dia	Each	10171.00	-
14.15.2.5	200mm dia	Each	18963.00	-
14.15.2.6	250mm dia	Each	30996.00	34426.00
14.15.2.7	300mm dia	Each	41606.00	52012.00
14.15.2.8	350mm dia	Each	68214.00	80367.00
14.15.2.9	400mm dia	Each	82545.00	103181.00
14.15.2.10	450mm dia	Each	107098.00	123163.00
14.15.2.11	500mm dia	Each	173812.00	199917.00
14.15.2.12	600mm dia	Each	215361.00	269201.00
14.15.2.13	700mm dia	Each	-	352410.00
14.15.2.14	750mm dia	Each	-	404553.00
14.15.2.15	800mm dia	Each	-	460292.00
14.15.2.16	900 mm dia	Each	-	582557.00
14.15.2.17	1000mm dia	Each	-	719204.00
14.15.2.18	1100mm dia	Each	-	870238.00
14.15.2.19	1200mm dia	Each	-	1035654.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
	Ductile Iron		
14.16	Providing & fixing following ductile iron double flanged check valve without damper (non-return valve) including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		CLASS PN- 1.0 / PN- 1.6
14.16.1	200mm dia	Each	53116.00
14.16.2	250mm dia	Each	126213.00
14.16.3	300mm dia	Each	145045.00
14.16.4	350 mm dia	Each	243810.00
14.16.5	400 mm dia	Each	298481.00
14.16.6	500 mm dia	Each	475427.00
14.16.7	600 mm dia	Each	583447.00
14.17	Fixing including Jointing of ductile iron double flanged check valve without damper (non-return valve) including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		CLASS PN- 1.0 / PN- 1.6
14.17.1	200mm dia	Each	617.00
14.17.2	250mm dia	Each	738.00
14.17.3	300mm dia	Each	847.00
14.17.4	350 mm dia	Each	1262.00
14.17.5	400 mm dia	Each	1447.00
14.17.6	500 mm dia	Each	2031.00
14.17.7	600 mm dia	Each	3245.00
14.18	Labour for laying and fixing of ductile iron double flanged check valve without damper (non-return valve) including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		CLASS PN- 1.0 / PN- 1.6
14.18.1	200mm dia	Each	197.00
14.18.2	250mm dia	Each	281.00
14.18.3	300mm dia	Each	371.00
14.18.4	350 mm dia	Each	643.00
14.18.5	400 mm dia	Each	779.00
14.18.6	500 mm dia	Each	1104.00
14.18.7	600 mm dia	Each	1711.00
14.19	Providing, fixing in position and jointing in pipe line, DI dual plate check valves of PN 1.0 rating of following dia (including jointing and jointing material), including all material, labour, testing and commissioning as per Technical Specifications.		
14.19.1	80mm dia	Each	5150.00
14.19.2	100mm dia	Each	6360.00
14.19.3	125mm dia	Each	7840.00
14.19.4	150mm dia	Each	9720.00
14.19.5	200mm dia	Each	17000.00
14.19.6	250mm dia	Each	23000.00
14.19.7	300mm dia	Each	28100.00
14.19.8	350mm dia	Each	42900.00
14.19.9	400mm dia	Each	56900.00
14.19.10	450mm dia	Each	61300.00
14.19.11	500mm dia	Each	63900.00
14.19.12	600mm dia	Each	102800.00
14.19.13	700mm dia	Each	268200.00
14.19.14	750mm dia	Each	311300.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.19.15	800mm dia	Each	328700.00	
14.19.16	900mm dia	Each	427800.00	
14.19.17	1000mm dia	Each	523800.00	
14.20	Only Labour for laying and fixing in position and jointing in pipe line, DI dual plate check valves of PN 1.0 rating of following dia (including jointing and jointing material), including all material, labour, testing and commissioning as per Technical Specifications.			
14.20.1	80mm dia	Each	773.00	
14.20.2	100mm dia	Each	954.00	
14.20.3	125mm dia	Each	1176.00	
14.20.4	150mm dia	Each	1458.00	
14.20.5	200mm dia	Each	2550.00	
14.20.6	250mm dia	Each	3450.00	
14.20.7	300mm dia	Each	4215.00	
14.20.8	350mm dia	Each	6435.00	
14.20.9	400mm dia	Each	8535.00	
14.20.10	450mm dia	Each	9195.00	
14.20.11	500mm dia	Each	9585.00	
14.20.12	600mm dia	Each	15420.00	
14.20.13	700mm dia	Each	40230.00	
14.20.14	750mm dia	Each	46695.00	
14.20.15	800mm dia	Each	49305.00	
14.20.16	900mm dia	Each	64170.00	
14.20.17	1000mm dia	Each	78570.00	
14.21	Providing, fixing in position and jointing in pipe line, DI Resilient Seated Dual Plate Check Valves in accordance with BS EN 12334 of following dia (including jointing and jointing material), including material, labour, testing and commissioning as per Technical Specifications.		PN 1.0	PN 1.6
14.21.1	100mm dia	Each	5340.00	5810.00
14.21.2	150mm dia	Each	8420.00	9180.00
14.21.3	200mm dia	Each	12800.00	14000.00
14.21.4	250mm dia	Each	20600.00	22600.00
14.22	Only Labour for laying and fixing in position and jointing in pipe line, DI Resilient Seated Dual Plate Check Valves in accordance with BS EN 12334 of following dia (including jointing and jointing material), including material, labour, testing and commissioning as per Technical Specifications.		PN 1.0	PN 1.6
14.22.1	100mm dia	Each	801.00	872.00
14.22.2	150mm dia	Each	1263.00	1377.00
14.22.3	200mm dia	Each	1920.00	2100.00
14.22.4	250mm dia	Each	3090.00	3390.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
	Cast Steel			
14.23	Providing, supplying, erecting, fixing & testing Cast Steel /Spheroidal Graphite (S.G.) Iron D/F Reflux Valves Single Door with jointing to pipe work (including all hardware and packing) water works quality with jointing to pipe without bypass arrangement, with gunmental seats etc. all completed.		Rating Class 150 (Working Pressure 20 kg/cm2 and Test Pressure 30 kg/cm2) CS-150	Rating Class 300 (Working Pressure 52 kg/cm2 and Test Pressure 78 kg/cm2) CS-300
14.23.1	80mm dia	Each	9856.00	14684.00
14.23.2	100mm dia	Each	15091.00	20697.00
14.23.3	150mm dia	Each	25566.00	34419.00
14.23.4	200mm dia	Each	48610.00	60975.00
14.23.5	250mm dia	Each	84641.00	110393.00
14.23.6	300mm dia	Each	111510.00	134411.00
(iii)	Butterfly Valve			
	Cast Iron			
14.24	Providing & fixing cast iron butterfly valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete		PN- 1.0	PN- 1.6
14.24.1	50mm dia	Each	1964.00	2045.00
14.24.2	65mm dia	Each	2119.00	2200.00
14.24.3	80mm dia	Each	2883.00	3004.00
14.24.4	100mm dia	Each	3113.00	3235.00
14.24.5	150mm dia	Each	4902.00	5106.00
14.24.6	200mm dia	Each	7017.00	7301.00
14.24.7	250mm dia	Each	10203.00	10609.00
14.24.8	300mm dia	Each	19727.00	20528.00
14.25	Labour for laying and fixing of Cast Iron butterfly valves including jointing & testing but without cost and jointing materials		PN- 1.0	PN- 1.6
14.25.1	50mm dia	Each	57.00	57.00
14.25.2	65mm dia	Each	64.00	64.00
14.25.3	80mm dia	Each	68.00	68.00
14.25.4	100mm dia	Each	84.00	84.00
14.25.5	150mm dia	Each	126.00	126.00
14.25.6	200mm dia	Each	153.00	153.00
14.25.7	250mm dia	Each	202.00	202.00
14.25.8	300mm dia	Each	324.00	324.00
	Ductile Iron			
14.26	Providing & fixing following ductile iron butterfly valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete		CLASS PN- 1.0	CLASS PN- 1.6
14.26.1	100mm dia (Wafer Type)	Each	6422.00	6422.00
14.26.2	150mm dia (wafer Type)	Each	9560.00	9560.00
14.26.3	200mm dia (double flange Short body)	Each	52989.00	52989.00
14.26.4	250mm dia (double flange Short body)	Each	63847.00	63847.00
14.26.5	300mm dia (double flange Short body)	Each	81326.00	85741.00
14.26.6	350mm dia (double flange Short body)	Each	94542.00	98957.00
14.26.7	400mm dia (double flange Short body)	Each	117189.00	119178.00
14.26.8	450mm dia (double flange Short body with gear box)	Each	145505.00	146306.00
14.26.9	500mm dia (double flange Short body with gear box)	Each	150383.00	179549.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.27	Labour for laying and fixing of ductile iron butterfly valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		PN- 1.0	PN- 1.6
14.27.1	100mm dia (Wafer Type)	Each	57.00	57.00
14.27.2	150mm dia (wafer Type)	Each	70.00	70.00
14.27.3	200mm dia (double flange Short body)	Each	124.00	124.00
14.27.4	250mm dia (double flange Short body)	Each	163.00	163.00
14.27.5	300mm dia (double flange Short body)	Each	202.00	210.00
14.27.6	350mm dia (double flange Short body)	Each	250.00	259.00
14.27.7	400mm dia (double flange Short body)	Each	305.00	305.00
14.27.8	450mm dia (double flange Short body with gear box)	Each	376.00	388.00
14.27.9	500mm dia (double flange Short body with gear box)	Each	358.00	468.00
14.28	Providing & fixing following ductile iron maually operated long body butterfly valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		CLASS PN- 1.0	
14.28.1	80mm dia	Each	5080.00	
14.28.2	100mm dia	Each	6090.00	
14.28.3	125mm dia	Each	8250.00	
14.28.4	150mm dia	Each	9450.00	
14.28.5	200mm dia	Each	16700.00	
14.28.6	250mm dia	Each	22700.00	
14.28.7	300mm dia	Each	27700.00	
14.28.8	350mm dia	Each	42500.00	
14.28.9	400mm dia	Each	56500.00	
14.28.10	450mm dia	Each	60900.00	
14.28.11	500mm dia	Each	63300.00	
14.28.12	600mm dia	Each	102200.00	
14.28.13	700mm dia	Each	175400.00	
14.28.14	750mm dia	Each	203500.00	
14.28.15	800mm dia	Each	214700.00	
14.28.16	900mm dia	Each	279400.00	
14.28.17	1000mm dia	Each	367500.00	
14.29	Only Labour for laying and fixing following ductile iron maually operated long body butterfly valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		CLASS PN- 1.0	
14.29.1	80mm dia	Each	762.00	
14.29.2	100mm dia	Each	914.00	
14.29.3	125mm dia	Each	1238.00	
14.29.4	150mm dia	Each	1418.00	
14.29.5	200mm dia	Each	2505.00	
14.29.6	250mm dia	Each	3405.00	
14.29.7	300mm dia	Each	4155.00	
14.29.8	350mm dia	Each	6375.00	
14.29.9	400mm dia	Each	8475.00	
14.29.10	450mm dia	Each	9135.00	
14.29.11	500mm dia	Each	9495.00	
14.29.12	600mm dia	Each	15330.00	
14.29.13	700mm dia	Each	26310.00	
14.29.14	750mm dia	Each	30525.00	
14.29.15	800mm dia	Each	32205.00	
14.29.16	900mm dia	Each	41910.00	
14.29.17	1000mm dia	Each	55125.00	

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.30	Providing & fixing following Resilient seated D/F ductile iron butterfly valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		CLASS PN- 1.0	CLASS PN- 1.6
14.30.1	Manually operated			
14.30.2	80mm dia	Each	7610.00	10200.00
14.30.3	100mm dia	Each	9240.00	13800.00
14.30.4	125mm dia	Each	11900.00	17200.00
14.30.5	150mm dia	Each	14200.00	19600.00
14.30.6	200mm dia	Each	22800.00	24800.00
14.30.7	250mm dia	Each	28900.00	31800.00
14.30.8	300mm dia	Each	40600.00	42800.00
14.30.9	350mm dia	Each	45400.00	60300.00
14.30.10	400mm dia	Each	63700.00	84400.00
14.30.11	450mm dia	Each	79900.00	103800.00
14.30.12	500mm dia	Each	90800.00	145900.00
14.30.13	600mm dia	Each	111200.00	187200.00
14.31	Only Labour for laying and fixing following Resilient seated D/F ductile iron butterfly valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		CLASS PN- 1.0	CLASS PN- 1.6
	Manually operated			
14.31.1	80mm dia	Each	1142.00	1530.00
14.31.2	100mm dia	Each	1386.00	2070.00
14.31.3	125mm dia	Each	1785.00	2580.00
14.31.4	150mm dia	Each	2130.00	2940.00
14.31.5	200mm dia	Each	3420.00	3720.00
14.31.6	250mm dia	Each	4335.00	4770.00
14.31.7	300mm dia	Each	6090.00	6420.00
14.31.8	350mm dia	Each	6810.00	9045.00
14.31.9	400mm dia	Each	9555.00	12660.00
14.31.10	450mm dia	Each	11985.00	15570.00
14.31.11	500mm dia	Each	13620.00	21885.00
14.31.12	600mm dia	Each	16680.00	28080.00
14.32	Providing & fixing following Resilient seated D/F ductile iron butterfly valves including jointing & testing with cost of jointing material such as bolts, nuts and rubber insertion all complete.		CLASS PN- 1.0	CLASS PN- 1.6
	Electrically Operated & SCADA Compatible			
14.32.1	80mm dia	Each	60000.00	62500.00
14.32.2	100mm dia	Each	61600.00	66200.00
14.32.3	125mm dia	Each	64300.00	69600.00
14.32.4	150mm dia	Each	66600.00	72000.00
14.32.5	200mm dia	Each	92900.00	94000.00
14.32.6	250mm dia	Each	99000.00	101900.00
14.32.7	300mm dia	Each	110800.00	112900.00
14.32.8	350mm dia	Each	146700.00	161600.00
14.32.9	400mm dia	Each	165100.00	185700.00
14.32.10	450mm dia	Each	181200.00	205100.00
14.32.11	500mm dia	Each	192100.00	247200.00
14.32.12	600mm dia	Each	212600.00	288500.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.33	Providing and supplying at site of ductile iron /spheroidal graphite (S.G.) iron D/F double eccentric resilient seated short body butterfly valves with gear box & handwheel, without bypass arrangement. Valves in accordance with BS EN 593 of PN 10/16 rated, with body & disc of ductile iron conforming to EN 1563/IS 1865 Gr.500/7 or Gr.400/15, Body seat of intergral SG Iron/S.S. AISI 316, seal retaining ring of steel C45/S.S. 1.4436, Shaft of S.S. 1.4021, Periferial disc seal and "O" rings of WRAS approved EPDM rubber (suitable for drinking water), Internal fasteners of stainless steel A2. Body & disc coated inside & outside with electrostatically applied epoxy powder coated blue colour. (suitable for drinking water.) as per DIN 30677- 2 & GSK guidelines with a coating thickness of min. 250 microns. Valves should be 100% tight shutoff. Face to face is per IS 13095 short body. Flange drilling as per IS 1538 raised face & pressure testing at manufactures works shall be done as per IS 13095. all complete.		PN-1.0	PN-1.6
14.33.1	200mm dia	Each	73085.00	88275.00
14.33.2	250mm dia	Each	91533.00	114230.00
14.33.3	300mm dia	Each	117497.00	150920.00
14.33.4	350mm dia	Each	146297.00	178408.00
14.33.5	400mm dia	Each	174371.00	203598.00
14.33.6	450mm dia	Each	225938.00	275976.00
14.33.7	500mm dia	Each	246472.00	330811.00
14.33.8	600mm dia	Each	358824.00	505483.00
14.33.9	700mm dia	Each	596783.00	696246.00
14.33.10	800mm dia	Each	708679.00	851659.00
14.33.11	900mm dia	Each	870307.00	-
14.33.12	1000mm dia	Each	1230863.00	-
	Cast Steel			
14.34	Providing, erecting & testing Cast Steel/ Spheroidal Graphite (S.G) Iron D/F Butterfly Valves with jointing to pipe work (including all hardware and packing) water works quality, having non-rising spindle with hand wheel and without bypass arrangement, spindle of stainless steel as per requirement, all complete.		Rating Class 150 (Working Pressure 20 kg/cm2 and Test Pressure 30 kg/cm2) CS-150	Rating Class 300 (Working Pressure 52 kg/cm2 and Test Pressure 78 kg/cm2) CS-300
14.34.1	300mm dia	Each	101999.00	124438.00
14.34.2	350mm dia	Each	108736.00	132659.00
14.34.3	400mm dia	Each	122134.00	149003.00
14.34.4	450mm dia	Each	130109.00	158733.00
14.34.5	500mm dia	Each	150611.00	183747.00
14.34.6	600mm dia	Each	169496.00	206785.00
(iv)	Air Valve			
	Cast Iron			
14.35	Providing & fixing cast iron single air valves, small orifice with screwed end as per IS : 14845-2000 including jointing & testing with cost of jointing material and rubber insertion all complete		PN- 1.0	PN- 1.6
14.35.1	25mm dia	Each	868.00	804.00
14.35.2	40mm dia	Each	1126.00	1142.00

S.No	Particulars of Items	Unit	Rate (in Rs.)	
14.36	Labour for laying and fixing of Cast Iron Air valves small orifice with screwed end .		PN- 1.0	PN- 1.6
14.36.1	25mm dia	Each	25.00	25.00
14.36.2	40mm dia	Each	29.00	29.00
14.37	Providing & fixing cast iron single air valves, large orifice with screwed end as per IS : 14845-2000 including jointing & testing with cost of jointing material and rubber insertion all complete		PN- 1.0	PN- 1.6
14.37.1	25mm dia	Each	1008.00	1235.00
14.37.2	40mm dia	Each	1018.00	1532.00
14.37.3	50mm dia	Each	1271.00	1548.00
14.38	Labour for laying and fixing of Cast Iron Air valves large orifice with screwed end.		PN- 1.0	PN- 1.6
14.38.1	25mm dia	Each	25.00	25.00
14.38.2	40mm dia	Each	29.00	29.00
14.38.3	50mm dia	Each	39.00	39.00
14.39	Providing & fixing cast iron double air valves, flanged without in-built isolating valve as per IS : 14845-2000 including jointing & testing with cost of jointing material and rubber insertion all complete		PN- 1.0	PN- 1.6
14.39.1	40mm dia	Each	2018.00	2223.00
14.39.2	50mm dia	Each	2641.00	2414.00
14.39.3	65mm dia	Each	3190.00	3203.00
14.39.4	80mm dia	Each	3340.00	3444.00
14.39.5	100mm dia	Each	4375.00	4233.00
14.39.6	150mm dia	Each	6853.00	7177.00
14.39.7	200mm dia	Each	10440.00	11586.00
14.40	Labour for laying and fixing of Cast Iron double air valves, flanged without in-built isolating valve.		PN- 1.0	PN- 1.6
14.40.1	40mm dia	Each	36.00	36.00
14.40.2	50mm dia	Each	65.00	65.00
14.40.3	65mm dia	Each	77.00	77.00
14.40.4	80mm dia	Each	77.00	77.00
14.40.5	100mm dia	Each	108.00	108.00
14.40.6	150mm dia	Each	147.00	147.00
14.40.7	200mm dia	Each	231.00	231.00
14.41	Providing & fixing cast iron double air valves, flanged with in-built isolating valve as per IS : 14845-2000 including jointing & testing with cost of jointing material and rubber insertion all complete.		PN- 1.0	PN- 1.6
14.41.1	40mm dia	Each	1871.00	2049.00
14.41.2	80mm dia	Each	2402.00	2842.00
14.41.3	100mm dia	Each	2867.00	8482.00
14.41.4	150mm dia	Each	2913.00	14783.00
14.41.5	200mm dia	Each	10918.00	23653.00
14.42	Labour for laying and fixing of Cast Iron double air valves, flanged with in-built isolating valve.		PN- 1.0	PN- 1.6
14.42.1	40mm dia	Each	36.00	36.00
14.42.2	80mm dia	Each	77.00	77.00
14.42.3	100mm dia	Each	108.00	108.00
14.42.4	150mm dia	Each	147.00	147.00
14.42.5	200mm dia	Each	231.00	231.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
	Ductile Iron		
14.43	Providing & fixing following ductile iron single chamber triple function temper proof air valves, \small orifice with screwed end as per IS:14845-2000 including jointing & testing with cost of jointing material and rubber insertion all complete as per IS:13095-1991.		CLASS PN- 1.0/ PN- 1.6
14.43.1	50mm dia	Each	13177.00
14.43.2	80mm dia	Each	13436.00
14.43.3	100mm dia	Each	17127.00
14.43.4	150mm dia	Each	23962.00
14.44	Labour for laying and fixing following ductile iron single chamber triple function temper proof air valves, small orifice with screwed end as per IS:14845-2000 including jointing & testing with cost of jointing material and rubber insertion all complete.		CLASS PN- 1.0/ PN- 1.6
14.44.1	50mm dia	Each	58.00
14.44.2	80mm dia	Each	69.00
14.44.3	100mm dia	Each	95.00
14.44.4	150mm dia	Each	127.00
14.45	Providing, fixing in position and jointing in pipe line DI Kinetic Double Air Valves of following dia (including jointing and jointing material), including all material, labour, testing and commissioning as per Technical Specifications.		
14.45.1	50mm dia	Each	8220.00
14.45.2	80mm dia	Each	9120.00
14.45.3	100mm dia	Each	13500.00
14.45.4	150mm dia	Each	29500.00
14.45.5	200mm dia	Each	31800.00
14.46	Only Labour for laying and fixing in position and jointing in pipe line DI Kinetic Double Air Valves of following dia (including jointing and jointing material), including all material, labour, testing and commissioning as per Technical Specifications.		
14.46.1	50mm dia	Each	1233.00
14.46.2	80mm dia	Each	1368.00
14.46.3	100mm dia	Each	2025.00
14.46.4	150mm dia	Each	4425.00
14.46.5	200mm dia	Each	4770.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
14.47	Providing, supplying, fixing & testing at site ductile iron / Spheroidal Graphite (S.G.) iron single / Double chamber tamper proof air valve without isolating sluice valve. Valves in accordance with BSEN 1074-4 of PN 10/16 rated, with body and bonnet of ductile iron conforming to EN 1563/IS 1865 Gr. 500/7 or Gr.400/15 floats, float guide, seat ring of stainless steel 1.4436/1.4306, seat ring gasket of WRAS approved EPDM rubber (suitable for drinking water), internal fasteners of stainless steel A2. Body & Bonnet coated inside & outside with electrostatically applied epoxy powder coated blue colour (suitable for drinking water) as per DIN 30677-2 & GSK guidelines with a coating thickness of min. 250 microns. Flange connections as per IS 1538 raised face & pressure testing at manufactures works shall be done. all complete. (For PN 10 & 16)		
14.47.1	50mm dia	Each	23168.00
14.47.2	80mm dia	Each	23774.00
14.47.3	100mm dia	Each	29245.00
14.47.4	150mm dia	Each	40674.00
14.47.5	200mm dia	Each	42308.00
	Cast Steel		
14.48	Providing, erecting, fixing & testing Kinetic Double Orifice Cast Steel Air Valves with an isolating Sluice Valve mounted in horizontal position operated by wheel gear suitable for working pressure of Class-150 rating (20 kg/cm ²). (Air Valve CS-150)		
14.48.1	80mm dia	Each	28474.00
14.48.2	100mm dia	Each	39689.00
14.48.3	150mm dia	Each	76053.00
14.48.4	200mm dia	Each	98308.00
14.49	Providing, erecting, fixing & testing Kinetic Double Orifice Cast Steel Air Valves with an isolating Sluice Valve mounted in horizontal position operated by wheel gear suitable for working pressure of Class 300 rating (52 kg/cm ²) (KDB Air Valve CS-300)		
14.49.1	80mm dia	Each	34689.00
14.49.2	100mm dia	Each	39653.00
14.49.3	150mm dia	Each	92664.00
14.49.4	200mm dia	Each	111855.00

S.No	Particulars of Items	Unit	Rate (in Rs.)
14.50	Providing and fixing in position air valve shaft including providing and fixing GI Medium Class or 6mm thick M.S. pipe shaft 2.70 M long over branch flange of air valve tee, providing PCC block of M-15 concrete, 150 mm thick around the air valve tee including encasing of vertical shaft in PCC M-15 as shown in type design together with providing and making flanged joints wherever required and fixing of air valve tee, etc. complete as per type design and as directed by Engineer - in- charge for following diameters of pipe lines (type design attached.)		
14.50.1	a) Foundation on Murum and Harder Strata.		
14.50.1.1	upto 150 mm	Each	5071.00
14.50.1.2	200 to 400 mm	Each	5941.00
14.50.1.3	450 to 900 mm	Each	12082.00
14.50.1.4	1000 to 1200 mm	Each	15172.00
14.50.2	b) Foundation in B. C. Soil or Any Other Soil.		
14.50.2.1	upto 150 mm	Each	6008.00
14.50.2.2	200 to 400 mm	Each	7247.00
14.50.2.3	450 to 900 mm	Each	13801.00
14.50.2.4	1000 to 1200 mm	Each	17307.00

CHAPTER- 15

Water Hammer Devices

1 Providing and supply items for zero velocity valves and air cushion valves conforming with the norms are to be used after third party quality assurance certificate.

2 SURGE PROTECTION WORKS

2.1 Providing and supply of zero velocity valves and air cushion valves Shall be Conforming to relevant Indian Standard with third party quality assurance certificate.

2.2 Zero Velocity Valve

2.2.1 The principle behind the design of this valve is to arrest the forward moving water column at zero momentum i.e. when its velocity is zero and before any return velocity is established.

2.2.2 The valve fitted in the pipeline consists of an outer shell and an inner fixed dome leaving a streamlined annular passage for water. A closing disc is mounted on central and peripheral guide rods and is held in the closed position by one or more springs when there is no flow of water.

2.2.3 A bypass connects the upstream and downstream sides of the disc. The springs are so designed that the disc remains in fully open position for velocity of water equal to 25% of the designed maximum velocity in the pipeline.

2.2.4 With sudden stoppage of pumps the forward velocity of water column goes on decreasing due to friction and gravity. When the forward velocity becomes less than 25% of the maximum, the flap starts closing at the same rate as the velocity of water.

2.2.5 The flap comes to the fully closed position when forward velocity approaches zero magnitude, water column on the upstream side of the valve is thus prevented from acquiring a revised velocity and taking part in creating surge pressures. The bypass valve maintains balanced pressures on the disc and also avoids vacuum on the downstream side of valve if that column experiences.

The main advantages of zero velocity valves are:

- Controlled closing characteristics, and
- Low loss of head due to streamlined design.

2.3 Air Cushion Valve

2.3.1 The principle of this valve is to allow large quantities of air in the pumping main during separation, entrap the air, compress it with the returning air column and expel the air under controlled pressure so as to dissipate the energy of the returning water column. An effective air cushion is thus provided.

- 2.3.2 The valve is mounted on TEE-joint on the rising main at locations where water column separation is likely. The valve has a spring loaded air inlet port, an outlet normally closed by a float, a spring loaded outlet poppet valve and an adjustable needle valve control orifice.
- 2.3.3 When there is sudden stoppage of pump due to power failure, partial vacuum is created in the main. With differential pressure, the spring loaded port opens and admits outside air into the main.
- 2.3.4 When the pressure in the main becomes near atmospheric, the inlet valve closes under spring pressure. The entrapped air is then compressed by the returning water column till the poppet valve opens. With float in dropped position, the air is expelled through poppet valve and controlled orifice under predetermined pressure thus dissipating the energy of the returning water column.
- 3 Measurement
Zero velocity valves and Air cushion valves shall be enumerated.
- 4 Rate
The rate shall include cost of all the materials and labour involved in the all the operation described in the item.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 15 - Water Hammer Devices

S.No.	Particulars of Items	Unit	Rate (in Rs.)
15.1	Providing, Supplying and fixing of Zero Velocity Valves of renowned make duly tested inclusive of all cost of inspection charges, transportation charges, transit insurance, loading/ unloading and stacking at site/ store etc, complete.		
15.1.1	100mm 10 kg/cm ²	Each	69500.00
15.1.2	100mm 15 kg/cm ²	Each	74900.00
15.1.3	100mm 20 kg/cm ²	Each	76700.00
15.1.4	100mm 25 kg/cm ²	Each	87900.00
15.1.5	150mm10 kg/cm ²	Each	86900.00
15.1.6	150mm15 kg/cm ²	Each	93400.00
15.1.7	150mm20 kg/cm ²	Each	102800.00
15.1.8	150mm25 kg/cm ²	Each	118200.00
15.1.9	200mm10 kg/cm ²	Each	93300.00
15.1.10	200mm15 kg/cm ²	Each	101700.00
15.1.11	200mm20 kg/cm ²	Each	110300.00
15.1.12	200mm25 kg/cm ²	Each	127000.00
15.1.13	250mm10 kg/cm ²	Each	129000.00
15.1.14	250mm15 kg/cm ²	Each	138900.00
15.1.15	250mm20 kg/cm ²	Each	152600.00
15.1.16	250mm25 kg/cm ²	Each	175500.00
15.1.17	300mm10 kg/cm ²	Each	152300.00
15.1.18	300mm15 kg/cm ²	Each	163500.00
15.1.19	300mm20 kg/cm ²	Each	179900.00
15.1.20	300mm25 kg/cm ²	Each	206600.00
15.1.21	350mm10 kg/cm ²	Each	162600.00
15.1.22	350mm15 kg/cm ²	Each	174900.00
15.1.23	350mm20 kg/cm ²	Each	200000.00
15.1.24	350mm25 kg/cm ²	Each	221200.00
15.1.25	400mm10 kg/cm ²	Each	183400.00
15.1.26	400mm15 kg/cm ²	Each	198000.00
15.1.27	400mm20 kg/cm ²	Each	228300.00
15.1.28	400mm25 kg/cm ²	Each	249500.00
15.1.29	450mm10 kg/cm ²	Each	201700.00
15.1.30	450mm15 kg/cm ²	Each	217900.00
15.1.31	450mm20 kg/cm ²	Each	244200.00
15.1.32	450mm25 kg/cm ²	Each	274500.00
15.1.33	500mm10 kg/cm ²	Each	227800.00
15.1.34	500mm15 kg/cm ²	Each	244800.00
15.1.35	500mm20 kg/cm ²	Each	269500.00
15.1.36	500mm25 kg/cm ²	Each	310000.00
15.1.37	600mm10 kg/cm ²	Each	249800.00
15.1.38	600mm15 kg/cm ²	Each	268600.00
15.1.39	600mm20 kg/cm ²	Each	295400.00
15.1.40	600mm25 kg/cm ²	Each	339600.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
15.1.41	700mm10 kg/cm2	Each	328300.00
15.1.42	700mm15 kg/cm2	Each	352800.00
15.1.43	700mm20 kg/cm2	Each	388100.00
15.1.44	700mm25 kg/cm2	Each	446400.00
15.1.45	750mm10 kg/cm2	Each	394900.00
15.1.46	750mm15 kg/cm2	Each	424500.00
15.1.47	750mm20 kg/cm2	Each	466800.00
15.1.48	750mm25 kg/cm2	Each	537000.00
15.1.49	800mm10 kg/cm2	Each	412400.00
15.1.50	800mm15 kg/cm2	Each	443400.00
15.1.51	800mm20 kg/cm2	Each	473900.00
15.1.52	800mm25 kg/cm2	Each	561100.00
15.1.53	900mm10 kg/cm2	Each	434500.00
15.1.54	900mm15 kg/cm2	Each	467100.00
15.1.55	900mm20 kg/cm2	Each	513600.00
15.1.56	900mm25 kg/cm2	Each	590800.00
15.1.57	1000mm10 kg/cm2	Each	566000.00
15.1.58	1000mm15 kg/cm2	Each	608400.00
15.1.59	1000mm20 kg/cm2	Each	680000.00
15.1.60	1000mm25 kg/cm2	Each	769700.00
15.1.61	1100mm10 kg/cm2	Each	661700.00
15.1.62	1100mm15 kg/cm2	Each	711400.00
15.1.63	1100mm20 kg/cm2	Each	790000.00
15.1.64	1100mm25 kg/cm2	Each	899900.00
15.1.65	1200mm10 kg/cm2	Each	755000.00
15.1.66	1200mm15 kg/cm2	Each	816600.00
15.1.67	1200mm20 kg/cm2	Each	969500.00
15.1.68	1200mm25 kg/cm2	Each	1031700.00
15.1.69	1300mm10 kg/cm2	Each	1085000.00
15.1.70	1300mm15 kg/cm2	Each	1167100.00
15.1.71	1300mm20 kg/cm2	Each	1232500.00
15.1.72	1300mm25 kg/cm2	Each	1499100.00
15.1.73	1400mm10 kg/cm2	Each	1332100.00
15.1.74	1400mm15 kg/cm2	Each	1432000.00
15.1.75	1400mm20 kg/cm2	Each	1439300.00
15.1.76	1400mm25 kg/cm2	Each	1811400.00
15.1.77	1500mm10 kg/cm2	Each	1490200.00
15.1.78	1500mm15 kg/cm2	Each	1601900.00
15.1.79	1500mm20 kg/cm2	Each	1793000.00
15.1.80	1500mm25 kg/cm2	Each	2026400.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
15.2	Providing, Supplying and fixing of Air cushion Valves of renowned make. The cost such as testing, inspection charges, transportation upto site, transit insurance, loading, unloading, stacking etc. all complete.		
15.2.1	Air cushion valves 100 mm TP 10 kg/cm2	Each	75670.00
15.2.2	Air cushion valves 100 mm TP 15 kg/cm2	Each	83145.00
15.2.3	Air cushion valves 100 mm TP 20 kg/cm2	Each	91425.00
15.2.4	Air cushion valves 100 mm TP 25 kg/cm2	Each	105225.00
15.2.5	Air cushion valves 150 mm TP 10 kg/cm2	Each	114770.00
15.2.6	Air cushion valves 150 mm TP 15 kg/cm2	Each	126155.00
15.2.7	Air cushion valves 150 mm TP 20 kg/cm2	Each	138805.00
15.2.8	Air cushion valves 150 mm TP 25 kg/cm2	Each	159620.00
15.2.9	Air cushion valves 200 mm TP 10 kg/cm2	Each	122475.00
15.2.10	Air cushion valves 200 mm TP 15 kg/cm2	Each	134780.00
15.2.11	Air cushion valves 200 mm TP 20 kg/cm2	Each	148235.00
15.2.12	Air cushion valves 200 mm TP 25 kg/cm2	Each	170315.00
15.2.13	Air cushion valves 300 mm TP 10 kg/cm2	Each	172270.00
15.2.14	Air cushion valves 300 mm TP 15 kg/cm2	Each	189635.00
15.2.15	Air cushion valves 300 mm TP 20 kg/cm2	Each	218040.00
15.2.16	Air cushion valves 300 mm TP 25 kg/cm2	Each	250700.00

CHAPTER- 16

Pumps

- 1 Scope
This Specification covers the requirements for designing, supplying, erecting, fixing & testing of different types of pumps for water supply & sewerage system
- 2 Applicable Codes
IS-6595 (Part 1): 2002 Cl.13.1: Horizontal centrifugal pumps for clear, cold water

IS 8035 : 1976: Shallow well hand pumps
IS 9301 : 1984: Deep well hand pumps (second revision)
IS 11004 : 1985: Code of practice for installation and maintenance of deep well hand pumps
Part 1: Installation
Part 2: Maintenance
IS 1520 : 1980 :Horizontal centrifugal pumps for clear, cold, fresh water (second revision)
IS 1710 : 1972: Vertical turbine pumps for clear, cold, fresh water (first revision)

IS 6595 : 1980: Horizontal centrifugal pumps for clear, cold, fresh water for centrifugal purposes (first revision)
IS 8034 : 1976: Submersible pump sets for clear, cold, fresh water
IS 8418 : 1977: Horizontal centrifugal self priming pumps
IS 8472 : 1977: Regenerative self priming pumps for clear, cold, fresh water
IS 9079 : 1979: Monoset pumps for clear, cold, fresh water for agricultural purposes
IS 9137 : 1978: Code for acceptance test for centrifugal mixed flow and axial pumps – Class C
IS 9542 : 1980: Horizontal centrifugal monoset pumps for cold, fresh water
IS 9694: Code of practice for selection, installation, operation and maintenance for horizontal centrifugal pumps for agricultural applications.
Part 1 : 1980: Selection
Part 2 : 1980: Installation
Part 3 : 1980: Operation
Part 4 : 1980: Maintenance
IS 10572 : 1983: Methods of sampling pumps
IS 10804 : 1986: Recommendation pumping systems for agricultural purposes (first revision)
IS 10805 : 1986: Foot valves, reflux valves or non return valves and bore valves to be used in suction lines of agricultural pumping systems (first revision)

IS 10981 : 1983: Code for acceptance test for centrifugal mixed flow and axial pumps – Class B
IS 11346 : 1985: Testing set up for agricultural pumps
IS 12225 : 1987: Technical requirements for jet, centrifugal pump combination

IS 5120 : 1977: Technical requirements for roto dynamic special purpose pumps

IS 12933-1 (2003), Part 1: requirements: Solar flat plate collector

IS 12933-2 (2003) Part 2: components: Solar flat plate collector

IS 12933-5 (2003) Part 5: Methods: Solar flat plate collector

IS 12976 (1990): Solar water heating systems - code of practice

IS 15450 (2004): Polyethylene/ aluminium / polyethylene composite pressure pipes for hot and cold water supplies

IS 2062 (1992): Mounting structure steel

IS 4759: Galvanization of mounting structure

IEC 61215: PV modules certificate

IEC 61730: Safety qualification testing for PV modules

IEC 61701: Salt mist corrosion testing for PV modules

IS 325 : 1978: Single phase small A.C. and universal electric motors

IS 900 : 1965: Guide for testing three phase induction motors

IS 996 : 1979: Three phase squirrel cage induction motors for centrifugal pumps for agricultural application

IS 4029 : 1967: Valves of performance characteristics for three phase induction motors

IS 7538 : 1975: Motors for submersible pump sets

IS 8789 : 1978: Performance requirement for constant speed compression ignition (diesel) engines for general purposes (up to 20 Kw)

IS 9283 : 1979: Performance requirements for constant speed compression ignition (diesel) engines for agricultural purposes (up to 20 Kw)

IS 10001 : 1981: Engine monoset pumps for clear, cold, fresh water for agricultural purposes

3 Rates

The rate shall include the cost of providing, supplying, fixing and testing of pumps except for the items of some pumps as ISSR is not prepared due to wide variation in rates per horse power as per duty conditions and type of material. For some pumps, the rates required shall be worked out on basis of quotations, offers from manufacturers, distributors, dealers in individual case.

4 Other relevant IS which are not mentioned but applicable, shall also be applied.

(For Detail Refer to Specifications mentioned under the relevant IS Code & CPHEEO Manual)

CHAPTER 16 - Pumps

S.No.	Particulars of Items	Unit	Rate (in Rs.)
16.1	Supply, delivery at site with necessary packing, receiving, unloading, shifting, storing, installation, testing and commissioning of Horizontal Centrifugal Split Casing pumps with motor, CI casing and casing ring, SS 316 impeller, SS 410 Shaft and shaft sleeve, coupling guard, common base plate, foundation bolts etc. complete with all respect as per the specification.		
16.1.1	Discharge 20 to 30 LPS and head 20 to 30 M	Each	132135.00
16.1.2	Discharge 20 to 30 LPS and head 31 to 40 M	Each	132135.00
16.1.3	Discharge 20 to 30 LPS and head 41 to 50 M	Each	148350.00
16.1.4	Discharge 20 to 30 LPS and head 51 to 60 M	Each	148350.00
16.1.5	Discharge 20 to 30 LPS and head 61 to 70 M	Each	148350.00
16.1.6	Discharge 31 to 40 LPS and head 20 to 30 M	Each	156170.00
16.1.7	Discharge 31 to 40 LPS and head 31 to 40 M	Each	156170.00
16.1.8	Discharge 31 to 40 LPS and head 41 to 50 M	Each	175145.00
16.1.9	Discharge 31 to 40 LPS and head 51 to 60 M	Each	221720.00
16.1.10	Discharge 31 to 40 LPS and head 61 to 70 M	Each	232875.00
16.1.11	Discharge 41 to 50 LPS and head 20 to 30 M	Each	175145.00
16.1.12	Discharge 41 to 50 LPS and head 31 to 40 M	Each	175145.00
16.1.13	Discharge 41 to 50 LPS and head 41 to 50 M	Each	189405.00
16.1.14	Discharge 41 to 50 LPS and head 51 to 60 M	Each	245525.00
16.1.15	Discharge 41 to 50 LPS and head 61 to 70 M	Each	245525.00
16.1.16	Discharge 51 to 60 LPS and head 20 to 30 M	Each	202285.00
16.1.17	Discharge 51 to 60 LPS and head 31 to 40 M	Each	202285.00
16.1.18	Discharge 51 to 60 LPS and head 41 to 50 M	Each	234945.00
16.1.19	Discharge 51 to 60 LPS and head 51 to 60 M	Each	283705.00
16.1.20	Discharge 51 to 60 LPS and head 61 to 70 M	Each	283705.00
16.1.21	Discharge 61 to 70 LPS and head 20 to 30 M	Each	202285.00
16.1.22	Discharge 61 to 70 LPS and head 31 to 40 M	Each	202285.00
16.1.23	Discharge 61 to 70 LPS and head 41 to 50 M	Each	234945.00
16.1.24	Discharge 61 to 70 LPS and head 51 to 60 M	Each	283705.00
16.1.25	Discharge 61 to 70 LPS and head 61 to 70 M	Each	283705.00
16.1.26	Discharge 71 to 80 LPS and head 20 to 30 M	Each	202285.00
16.1.27	Discharge 71 to 80 LPS and head 31 to 40 M	Each	218385.00
16.1.28	Discharge 71 to 80 LPS and head 41 to 50 M	Each	276805.00
16.1.29	Discharge 71 to 80 LPS and head 51 to 60 M	Each	276805.00
16.1.30	Discharge 71 to 80 LPS and head 61 to 70 M	Each	348565.00
16.1.31	Discharge 81 to 90 LPS and head 20 to 30 M	Each	297390.00
16.1.32	Discharge 81 to 90 LPS and head 31 to 40 M	Each	297390.00
16.1.33	Discharge 81 to 90 LPS and head 41 to 50 M	Each	342815.00
16.1.34	Discharge 81 to 90 LPS and head 51 to 60 M	Each	396635.00
16.1.35	Discharge 81 to 90 LPS and head 61 to 70 M	Each	396635.00
16.1.36	Discharge 91 to 100 LPS and head 20 to 30 M	Each	367080.00
16.1.37	Discharge 91 to 100 LPS and head 31 to 40 M	Each	415380.00
16.1.38	Discharge 91 to 100 LPS and head 41 to 50 M	Each	520375.00
16.1.39	Discharge 91 to 100 LPS and head 51 to 60 M	Each	556485.00
16.1.40	Discharge 91 to 100 LPS and head 61 to 70 M	Each	608120.00
16.1.41	Discharge 101 to 120 LPS and head 20 to 30 M	Each	371105.00
16.1.42	Discharge 102 to 120 LPS and head 31 to 40 M	Each	452525.00
16.1.43	Discharge 103 to 120 LPS and head 41 to 50 M	Each	556485.00
16.1.44	Discharge 104 to 120 LPS and head 51 to 60 M	Each	608120.00
16.1.45	Discharge 105 to 120 LPS and head 61 to 70 M	Each	778665.00
16.1.46	Discharge 121 to 140 LPS and head 20 to 30 M	Each	418485.00
16.1.47	Discharge 121 to 140 LPS and head 31 to 40 M	Each	547975.00
16.1.48	Discharge 121 to 140 LPS and head 41 to 50 M	Each	595125.00
16.1.49	Discharge 121 to 140 LPS and head 51 to 60 M	Each	637560.00
16.1.50	Discharge 121 to 140 LPS and head 61 to 70 M	Each	920690.00
16.1.51	Discharge 141 to 160 LPS and head 20 to 30 M	Each	581440.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
16.1.52	Discharge 141 to 160 LPS and head 31 to 40 M	Each	581440.00
16.1.53	Discharge 141 to 160 LPS and head 41 to 50 M	Each	637560.00
16.1.54	Discharge 141 to 160 LPS and head 51 to 60 M	Each	679535.00
16.1.55	Discharge 141 to 160 LPS and head 61 to 70 M	Each	920690.00
16.1.56	Discharge 161 to 180 LPS and head 20 to 30 M	Each	573505.00
16.1.57	Discharge 161 to 180 LPS and head 31 to 40 M	Each	581440.00
16.1.58	Discharge 161 to 180 LPS and head 41 to 50 M	Each	581440.00
16.1.59	Discharge 161 to 180 LPS and head 51 to 60 M	Each	744280.00
16.1.60	Discharge 161 to 180 LPS and head 61 to 70 M	Each	965080.00
16.1.61	Discharge 181 to 200 LPS and head 20 to 30 M	Each	573505.00
16.1.62	Discharge 181 to 200 LPS and head 31 to 40 M	Each	706445.00
16.1.63	Discharge 181 to 200 LPS and head 41 to 50 M	Each	752905.00
16.1.64	Discharge 181 to 200 LPS and head 51 to 60 M	Each	933455.00
16.1.65	Discharge 181 to 200 LPS and head 61 to 70 M	Each	965080.00
16.2	Supply, delivery at site with necessary packing, receiving, unloading, shifting, storing, installation, testing and commissioning of Horizontal Centrifugal Split Casing pumps with motor, CI casing and casing ring, SS 316 impeller, SS 410 Shaft and shaft sleeve, coupling guard, common base plate, foundation bolts etc. complete with all respect as per the specification		
16.2.1	Discharge 201 to 220 LPS and head 20 to 30 M	Each	638710.00
16.2.2	Discharge 201 to 220 LPS and head 31 to 40 M	Each	702075.00
16.2.3	Discharge 201 to 220 LPS and head 41 to 50 M	Each	933455.00
16.2.4	Discharge 201 to 220 LPS and head 51 to 60 M	Each	965080.00
16.2.5	Discharge 201 to 220 LPS and head 61 to 70 M	Each	1001190.00
16.2.6	Discharge 221 to 240 LPS and head 20 to 30 M	Each	642850.00
16.2.7	Discharge 221 to 240 LPS and head 31 to 40 M	Each	731400.00
16.2.8	Discharge 221 to 240 LPS and head 41 to 50 M	Each	939550.00
16.2.9	Discharge 221 to 240 LPS and head 51 to 60 M	Each	971865.00
16.2.10	Discharge 221 to 240 LPS and head 61 to 70 M	Each	1001190.00
16.2.11	Discharge 241 to 260 LPS and head 20 to 30 M	Each	686435.00
16.2.12	Discharge 241 to 260 LPS and head 31 to 40 M	Each	740255.00
16.2.13	Discharge 241 to 260 LPS and head 41 to 50 M	Each	945185.00
16.2.14	Discharge 241 to 260 LPS and head 51 to 60 M	Each	1001190.00
16.2.15	Discharge 241 to 260 LPS and head 61 to 70 M	Each	1013380.00
16.2.16	Discharge 261 to 280 LPS and head 20 to 30 M	Each	699775.00
16.2.17	Discharge 261 to 280 LPS and head 31 to 40 M	Each	790855.00
16.2.18	Discharge 261 to 280 LPS and head 41 to 50 M	Each	945185.00
16.2.19	Discharge 261 to 280 LPS and head 51 to 60 M	Each	1001190.00
16.2.20	Discharge 261 to 280 LPS and head 61 to 70 M	Each	1013380.00
16.2.21	Discharge 281 to 300 LPS and head 20 to 30 M	Each	699775.00
16.2.22	Discharge 281 to 300 LPS and head 31 to 40 M	Each	790855.00
16.2.23	Discharge 281 to 300 LPS and head 41 to 50 M	Each	971865.00
16.2.24	Discharge 281 to 300 LPS and head 51 to 60 M	Each	1013380.00
16.2.25	Discharge 281 to 300 LPS and head 61 to 70 M	Each	1082150.00
16.2.26	Discharge 301 to 325 LPS and head 20 to 30 M	Each	732895.00
16.2.27	Discharge 301 to 325 LPS and head 31 to 40 M	Each	826045.00
16.2.28	Discharge 301 to 325 LPS and head 41 to 50 M	Each	1107105.00
16.2.29	Discharge 301 to 325 LPS and head 51 to 60 M	Each	1132175.00
16.2.30	Discharge 301 to 325 LPS and head 61 to 70 M	Each	1190135.00
16.2.31	Discharge 326 to 350 LPS and head 20 to 30 M	Each	750835.00
16.2.32	Discharge 326 to 350 LPS and head 31 to 40 M	Each	862040.00
16.2.33	Discharge 326 to 350 LPS and head 41 to 50 M	Each	1107105.00
16.2.34	Discharge 326 to 350 LPS and head 51 to 60 M	Each	1190135.00
16.2.35	Discharge 326 to 350 LPS and head 61 to 70 M	Each	1190135.00
16.2.36	Discharge 351 to 400 LPS and head 20 to 30 M	Each	830185.00
16.2.37	Discharge 351 to 400 LPS and head 31 to 40 M	Each	898955.00
16.2.38	Discharge 351 to 400 LPS and head 41 to 50 M	Each	1132175.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)		
16.2.39	Discharge 351 to 400 LPS and head 51 to 60 M	Each	1190135.00		
16.2.40	Discharge 351 to 400 LPS and head 61 to 70 M	Each	1554225.00		
	Submersible Pump Set	Unit	Supply Rates (in Rs.)	Erection Rates (in Rs.)	Total Amount (in Rs.)
16.3	Providing, erecting and giving test of submersible pump set conforming to IS 8034 and motor conforming to IS 9283, with water proof winding. Pump shall be suitable for various delivery head and discharge with stainless steel shaft. Motor suitable for working on 415 V \pm 10%, 3 Ph, 50 Hz A.C. Supply, with cable guard, thrust carbon/fiber bearing to withstand entire hydraulic thrust. The pump set shall be suitable for direct coupling, with suitable suction strainer. Pump should have suitable discharge out let as per manufacturer's design. Antithrust stream lined non return valve shall be provided with the pump. 3 m submersible copper conductor cable in single / double run and 2 pairs of suitable size erection clamp 10 mm thick shall be provided with each pump.				
16.3.1	Submersible Pump set 100 mm dia (with Polypropylene / Noryl Impeller) up to 20 stages				
16.3.1.1	1.5 HP	Each	15572.00	3484.00	19056.00
16.3.1.2	2.0 HP	Each	16149.00	3484.00	19633.00
16.3.1.3	2.5 HP	Each	17892.00	3484.00	21376.00
16.3.1.4	3.0 HP	Each	18207.00	3484.00	21691.00
16.3.1.5	4.0 HP	Each	19091.00	3484.00	22575.00
16.3.1.6	5.0 HP	Each	24654.00	3484.00	28138.00
16.3.1.7	Supply rate should be increased by Rs. 200/-per stage for pump with more than 20 stages for item no. 16.3.1				
16.3.2	Submersible Pump 150 mm dia (with Bronze / Stainless steel (CF8M) Impeller) up to 8 stages				
16.3.2.1	1.5 HP	Each	20889.00	3484.00	24373.00
16.3.2.2	2.0 HP	Each	21987.00	3484.00	25471.00
16.3.2.3	3.0 HP	Each	23615.00	3484.00	27099.00
16.3.2.4	4.0 HP	Each	24465.00	3484.00	27949.00
16.3.2.5	5.0 HP	Each	25725.00	3484.00	29209.00
16.3.2.6	6.0 HP	Each	28203.00	4538.00	32741.00
16.3.2.7	7.5 HP	Each	29474.00	4538.00	34012.00
16.3.2.8	Supply rate should be increased by Rs. 600/- per stage for pump with more than 8 stages				
16.3.3	Submersible Pump 150 mm dia (with Bronze / Stainless steel(CF8M) Impeller) up to 12 stages				
16.3.3.1	8.0 HP	Each	38598.00	5047.00	38598.00
16.3.3.2	9.0 HP	Each	38899.00	5047.00	38899.00
16.3.3.3	10.0 HP	Each	41040.00	5047.00	41040.00
16.3.3.4	11.0 HP	Each	44227.00	5047.00	44227.00
16.3.3.5	12.5 HP	Each	44965.00	5836.00	44965.00
16.3.3.6	15.0 HP	Each	47215.00	5836.00	47215.00
16.3.3.7	Supply rate should be increased by Rs. 600/- per stage for pump with more than 12 stages				

S.No.	Particulars of Items	Unit	Rate (in Rs.)		
16.3.4	Submersible Pump 150 mm dia (with Bronze / Stainless steel (CF8M) Impeller) up to 15 stages				
16.3.4.1	17.5 HP	Each	45478.00	6626.00	52104.00
16.3.4.2	20.0 HP	Each	53405.00	6626.00	60031.00
16.3.4.3	22.5 HP	Each	65918.00	6626.00	72544.00
16.3.4.4	Supply rate should be increased by Rs. 600/- per stage for pump with more than 15 stages for Borewell only.				
16.3.4.5	For other use 200 mm dia pump shall be preferred over 150 mm dia with more than 15 stage pump.				
	a. upto 8 stages 3% of supply rates				
	b. upto 12 stages 4% of supply rates				
	c. upto 15 stages 5% of supply rates				
16.3.5	Submersible Pump 200 mm dia (with Bronze / Stainless steel (CF8M) Impeller) up to 5 stages of category A & B				
16.3.5.1	7.5 HP	Each	28898.00	4538.00	33436.00
16.3.5.2	10.0 HP	Each	33676.00	5047.00	38723.00
16.3.5.3	12.5 HP	Each	36818.00	5836.00	42654.00
16.3.5.3	Supply rate should be increased by Rs. 1900/- per stage for pump with more than 5 stages				
16.3.6	Submersible Pump 200 mm dia (with Bronze /Stainless steel (CF8M) Impeller) up to 8 stages of category A & B				
16.3.6.1	15.0 HP	Each	50831.00	6626.00	57457.00
16.3.6.2	17.5 HP	Each	53859.00	6626.00	60485.00
16.3.6.3	20.0 HP	Each	59570.00	6626.00	66196.00
16.3.6.4	22.5 HP	Each	66902.00	6626.00	73528.00
16.3.6.5	25.0 HP	Each	66957.00	6626.00	73583.00
16.3.6.6	27.5 HP	Each	77990.00	6626.00	84616.00
16.3.6.7	Supply rate should be increased by Rs. 1900/- per stage for pump with more than 8 stages				
16.3.7	Submersible Pump 250 mm dia (with Bronze / Stainless steel(CF8M) Impeller) up to 8 stages of category A & B				
16.3.7.1	15.0 HP	Each	52574.00	6626.00	59200.00
16.3.7.2	20.0 HP	Each	56175.00	6627.00	62802.00
16.3.7.3	22.5 HP	Each	71925.00	6628.00	78553.00
16.3.7.4	25.0 HP	Each	75261.00	6629.00	81890.00
16.3.7.5	30.0 HP	Each	76632.00	6630.00	83262.00
16.3.8	Submersible monoblock Pump set (with Bronze / Stainless steel(CF8M) Impeller) Horizontal / Vertical - up to 3 stages (Motor with water lubricated bearing to accept entire hydraulic thrust)				
16.3.8.1	3.0 HP	Each	13519.00	3484.00	17003.00
16.3.8.2	5.0 HP	Each	15033.00	4010.00	19043.00
16.3.8.3	7.5 HP	Each	27417.00	4538.00	31955.00
16.3.8.4	10.0 HP	Each	32878.00	4538.00	37416.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)		
	Centrifugal Monoblock Pump set				
16.4	Providing, erecting and giving test of Centrifugal Monoblock pump set conforming to IS 9079 operating at 2900 RPM with CI impeller, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on 415 V \pm 10%, 3 Ph, 50 Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C. foundation block.		Supply Rates (in Rs.)	Erection Rates (in Rs.)	Total Amount (in Rs.)
16.4.1	Centrifugal Monoblock Pump set (Single Stage)				
16.4.1.1	2.0 HP	Each	11441.00	2450.00	13891.00
16.4.1.2	3.0 HP	Each	13869.00	2450.00	16319.00
16.4.1.3	5.0 HP	Each	16953.00	3220.00	20173.00
16.4.1.4	7.5 HP	Each	20654.00	3220.00	23874.00
16.4.1.5	10.0 HP	Each	27359.00	3220.00	30579.00
16.4.1.6	12.5 HP	Each	33344.00	4010.00	37354.00
16.4.1.7	15.0 HP	Each	36391.00	4010.00	40401.00
16.4.1.8	20.0 HP	Each	52466.00	4010.00	56476.00
16.4.1.9	25.0 HP	Each	69012.00	4010.00	73022.00
16.4.1.10	30.0 HP	Each	85447.00	4010.00	89457.00
16.4.2	Centrifugal Monoblock Pump set (Two Stage)				
16.4.2.1	5.0 HP	Each	19211.00	3220.00	22431.00
16.4.2.2	7.5 HP	Each	23338.00	3220.00	26558.00
16.4.2.3	10.0 HP	Each	30939.00	3220.00	34159.00
16.4.2.4	12.5 HP	Each	38193.00	4010.00	42203.00
16.4.2.5	15.0 HP	Each	45431.00	4010.00	49441.00
16.4.2.6	20.0 HP	Each	50652.00	4010.00	54662.00
	Centrifugal Coupled Pump set				
16.5	ISSR for centrifugal coupled set is not prepared due to wide variation in rates per horse power as per duty conditions and type of material. The rates required shall be worked out on basis of quotations, offers from manufacturers, distributors, dealers in individual case.		Supply Rates (in Rs.)	Erection Rates (in Rs.)	Total Amount (in Rs.)
	Centrifugal Coupled Pump set -- Erection charges				
16.6	Erecting and giving test of centrifugal coupled pump set with foot mounted motor excluding base plate coupling and foundation bolts, etc. on provided concrete foundation / RSJ with accurate levelling with shims and proper alignment.				
16.6.1	15 to 30 HP	Each		4594.00	
16.6.2	31 to 50 HP	Each		5498.00	
16.6.3	51 to 100 HP	Each		6551.00	
16.6.4	101 to 150 HP	Each		7850.00	
16.6.5	151 to 200 HP	Each		9149.00	
16.6.6	201 to 250 HP	Each		10466.00	
16.6.7	251 to 300 HP	Each		12554.00	
16.6.8	More than 300 HP	HP		58.00	

S.No.	Particulars of Items	Unit	Rate (in Rs.)		
	Vacuum Pump set (Monoblock)				
16.7	Providing, erecting Kirloskar make or other approved make Mono block Vacuum pump set with base plate excluding C.C. foundation / cross channels / RSJ frame and foundation bolts etc complete.				
16.7.1	1 HP, single Ph (Type kV 20)	Each	20408.00	2450.00	22858.00
16.7.2	3 HP, three Ph (Type kV 30)	Each	38267.00	2450.00	40717.00
	Vacuum Pump set (Coupled)				
16.8	Providing, erecting Coupled Vacuum pump set with horizontal foot mounted TEFC squirrel cage motor working on three phase 50 Hz, 415 Volts +/- 10% with base plate including cost of flexible couplings, coupling guard etc complete.				
16.8.1	5 HP (Type DV 40)	Each	74829.00	3541.00	78370.00
16.8.2	10 HP (Type DV 50)	Each	92788.00	3541.00	96329.00
note	Cost of starters, cable, switches, suitable GI Pipe with coupling and specials, valves etc shall be added as per ISSR.				
16.9	V.T. Pumps, Water / Oil lubricated		Supply Rates (in Rs.)	Erection Rates (in Rs.)	Total Amount (in Rs.)
	ISSR for Vertical Turbine Pump set is not prepared due to wide variation in rates per horse power as per duty conditions, number of stages, column pipe size and length required and type of material. The rates required shall be worked out on basis of quotations, offers from manufacturer, distributors, dealers in individual case.				
16.10	V.T. Pump erection charges (For column length up to 6 m)				
16.10.1	Erecting, commissioning and giving test of Vertical Turbine Pump (Water Lubricated) including bowl assembly and discharge head etc on provided channel / RSJ / RCC beam including erecting on provided sole plate with blue matching.		Supply Rates (in Rs.)	Erection Rates (in Rs.)	Total Amount (in Rs.)
16.10.1.1	Up to 30 HP	Each	5705.00		
16.10.1.2	31 HP to 100 HP	Each	8507.00		
16.10.1.3	101 HP to 200 HP	Each	11764.00		
16.10.1.4	201 HP to 300 HP	Each	15698.00		
16.10.1.5	above 300 HP	HP	58.00		
16.10.2	For column length more than 6m additional rate per column joint				
16.10.2.1	100 mm dia column pipe	Joint	172.00		
16.10.2.2	150 mm dia column pipe	Joint	323.00		
16.10.2.3	200 mm dia column pipe	Joint	360.00		
16.10.2.4	300 mm dia column pipe	Joint	492.00		
16.10.2.5	350 mm dia column pipe	Joint	642.00		
16.10.2.6	400 mm dia column pipe	Joint	793.00		
16.10.2.7	450 mm dia column pipe	Joint	981.00		
16.10.2.8	500 mm dia column pipe	Joint	1057.00		
16.10.2.9	600 mm dia column pipe and above	Joint	1264.00		
16.10.2.10	Add 5% for erection of oil lubricated pumps				

S.No.	Particulars of Items	Unit	Rate (in Rs.)		
	Sewage Pump				
16.11	Sewage Pumps -Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		Supply Rates (in Rs.)	Erection Rates (in Rs.)	Total Amount (in Rs.)
	Head upto 10 Mtrs				
16.11.1	1 HP (Up to 9000 LPH)	Each	57750.00	4594.00	62344.00
16.11.2	2 HP (Up to 12000 LPH)	Each	58167.00	4594.00	62761.00
16.11.3	3 HP (Up to 18000 LPH)	Each	77910.00	4594.00	82504.00
16.11.4	5 HP (Up to 35000 LPH)	Each	90300.00	4594.00	94894.00
16.11.5	7.5 HP (Up to 72000 LPH)	Each	94500.00	4594.00	99094.00
16.11.6	10 HP (Up to 90000 LPH)	Each	134400.00	4594.00	138994.00
16.11.7	15 HP (Up to 132000 LPH)	Each	162750.00	4594.00	167344.00
16.11.8	20 HP (Up to 192000 LPH)	Each	231000.00	4594.00	235594.00
16.11.9	25 HP (Up to 228000 LPH)	Each	278250.00	4594.00	282844.00
16.11.10	30 HP (Up to 240000 LPH)	Each	333900.00	4594.00	338494.00
16.11.11	35 HP (Up to 276000 LPH)	Each	404250.00	6024.00	410274.00
	Head upto 20 Mtrs				
16.11.12	7.5 HP (Up to 36000 LPH)	Each	90563.00	4594.00	95157.00
16.11.13	10 HP (Up to 48000 LPH)	Each	120750.00	4595.00	125345.00
16.11.14	15 HP (Up to 60000 LPH)	Each	162750.00	4596.00	167346.00
16.11.15	20 HP (Up to 90000 LPH)	Each	231000.00	4597.00	235597.00
16.11.16	25 HP (Up to 120000 LPH)	Each	278250.00	4598.00	282848.00
16.11.17	30 HP (Up to 168000 LPH)	Each	319448.00	4599.00	324047.00
16.11.18	35 HP (Up to 216000 LPH)	Each	365280.00	6024.00	371304.00
	Head upto 30 Mtrs				
16.11.19	10 HP (Up to 18000 LPH)	Each	122850.00	4594.00	127444.00
16.11.20	15 HP (Up to 27000 LPH)	Each	172534.00	4595.00	177129.00
16.11.21	20 HP (Up to 36000 LPH)	Each	198071.00	4596.00	202667.00
16.11.22	25 HP (Up to 54000 LPH)	Each	278250.00	4597.00	282847.00
16.11.23	30 HP (Up to 78000 LPH)	Each	319448.00	4598.00	324046.00
16.11.24	35 HP (Up to 120000 LPH)	Each	348476.00	6024.00	354500.00
	Vacuum / Combination gauge				
16.12	Providing, erecting Vacuum Gauge / Combination gauge of required range complete with syphon tube, isolating cock suitable for 12 mm dia G.I. Pipe. Vacuum / Combination gauge shall be installed as directed, with tapping on main lines.		Supply Rates (in Rs.)	Erection Rates (in Rs.)	Total Amount (in Rs.)
16.12.1	Vacuum / Combination gauge - 100 mm dia	Each	803.00	67.00	870.00
16.12.2	Vacuum / Combination gauge - 150 mm dia	Each	908.00	67.00	975.00
	Foot Valve				
16.13	Providing, erecting C.I. foot valve having single leather flap and gunmetal seating. Valve shall be fixed on suction side of pump as per requirement including jointing material and hardware.		Supply Rates (in Rs.)	Erection Rates (in Rs.)	Total Amount (in Rs.)
	Screwed Type				
16.13.1	50 mm	Each	392.00	125.00	517.00
16.13.2	65 mm	Each	522.00	125.00	647.00
16.13.3	80 mm	Each	668.00	125.00	793.00
16.13.4	100 mm	Each	1028.00	240.00	1268.00
16.13.5	125 mm	Each	1582.00	240.00	1822.00
16.13.6	150 mm	Each	2300.00	240.00	2540.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)		
	Flanged Type				
16.13.7	50 mm	Each	1058.00	452.00	1510.00
16.13.8	65 mm	Each	1246.00	452.00	1698.00
16.13.9	80 mm	Each	1417.00	452.00	1869.00
16.13.10	100 mm	Each	1946.00	588.00	2534.00
16.13.11	125 mm	Each	3252.00	588.00	3840.00
16.13.12	150 mm	Each	4745.00	588.00	5333.00
	Solar water pump systems				
16.14	Supplying, installing, testing and commissioning of solar water pump of 1 HP capacity, DC surface type, 90000 LPD, total head 10m, comprising of 900 Wp PV array / submersible type (with controller) 42000 LPD, total head of 30m, comprising of 1200 Wp PV array mounted on GI structure with necessary hardware complete with 5 years on site performance warrantee	Each	-	-	80953.00
16.15	Supplying, installing, testing and commissioning of solar water pump of 2 HP capacity, DC surface type, 180000 LPD total head 10m, comprising of 1800 Wp PV array / submersible type (with controller) 63000 LPD, total head of 30m, comprising of 1800 Wp PV array respectively mounted on GI structure with necessary hardware with 5 years on site performance warrantee	Each	-	-	161905.00
16.16	Supplying, installing, testing and commissioning of solar water pump of 3 HP capacity, DC surface type, 135000 LPD, total head of 20m, comprising of 2700 Wp PV array / submersible type (with controller) 105000LPD/63000LPD/ 42000LPD total head of 30m/50m/70m, comprising of 3000Wp/ 3000Wp/3000Wp PV array respectively mounted on GI structure with necessary hardware with 5 years on site performance warrantee.	Each	-	-	242858.00
16.17	Supplying, installing, testing and commissioning of solar water pump of 5 HP capacity, DC submersible type (with controller) 100800 LPD/ 67200LPD/ 45600LPD, total head of 50m/70m/ 100m, comprising of 4800Wp/ 4800Wp/ 4800Wp/ PV array respectively mounted on GI structure with necessary hardware with 5 years on site performance warrantee.	Each	-	-	366667.00
16.18	Supplying, installing, testing and commissioning of solar water pump of 1 HP capacity, AC surface type, 81000 LPD total head of 10m, comprising of 900 Wp PV array / submersible type (with controller) 38400 LPD, total head of 45m, comprising of 1200Wp PV array respectively mounted on GI structure with necessary hardware and suitable inverter with 5 years on site performance warrantee.	Each	-	-	76191.00
16.19	Supplying, installing, testing and commissioning of solar water pump of 2 HP capacity, AC surface type, 162000 LPD, total head of 10m, comprising of 1800 Wp PV array / submersible type (with controller) 57600 LPD, head of 30m, comprising of 1800Wp PV array respectively mounted on GI structure with necessary hardware and suitable inverter with 5 years on site performance warrantee.	Each	-	-	152381.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)		
16.2	Supplying, installing, testing and commissioning of solar water pump of 3 HP capacity, AC surface type, 243000 LPD, total head of 10m, comprising of 2700Wp PV array / submersible type (with controller) 121500LPD/96000LPD/ 57000LPD/ 39000LPD, total head of 20m/30m/ 50m/70m, comprising of 2700Wp/3000Wp/ 3000Wp/ 3000Wp PV array respectively mounted on GI structure with necessary hardware and suitable inverter with 5 years on site performance warrantee	Each	-	-	228572.00
16.21	Supplying, installing, testing and commissioning of solar water pump of 5 HP capacity, AC surface type, 432000 LPD/ 2160000 LPD, total head of 10m/20m, comprising of 4800Wp/ 4800Wp PV array respectively / submersible type (with controller) of 91200LPD/ 62400LPD/ 40800LPD total head of 50m/70m/100m, comprising of 4800Wp/ 4800Wp/ 4800Wp PV array respectively mounted on GI structure with necessary hardware and suitable inverter with 5 years on site performance warrantee.	Each	-	-	309524.00
16.22	Supplying, installing, testing and commissioning of 7.5 HP capacity AC/DC solar water pump (SPV pump), comprising of min. 7.5 KWp capacity multi crystalline SPV modules mounted on GI Structure with necessary hardware with controller, suitable size HDPE / PVC-O delivery water pipe line up to 60 mtr length inside or above water tank/borewell with necessary control valves and necessary power supply cable of appropriate size complete with 5 years on site performance warrantee.	Each	595106.00	13229.00	608335.00
16.23	Supplying, installing, testing and commissioning of 10 HP capacity AC/DC Solar water pump (SPV pump), comprising of min. 10 KWp capacity multi crystalline SPV modules mounted on GI Structure with necessary hardware with controller, suitable size HDPE / PVC-O delivery water pipe line up to 60 mtr length inside or above water tank/ borewell with necessary control valves and necessary power supply cable of appropriate size complete with 5 years on site performance warrantee.	Each	763478.00	17107	780585.00
16.24	Supplying, installing, testing and commissioning of 10 HP capacity AC/DC Solar water pump (SPV pump), comprising of min. 10 KWp capacity multi crystalline SPV modules mounted on GI Structure with necessary hardware with controller, suitable size HDPE / PVC-O delivery water pipe line up to 60 mtr length inside or above water tank/ borewell with necessary control valves and necessary power supply cable of appropriate size complete with 5 years on site performance warrantee	Each	763478.00	17107	780585.00

CHAPTER- 17

SEWER APPURTENANCES

1 Manhole :-

(i) Manhole are the Important & essential Items in any Sewerage System. Manhole are classified as

(a) Straight-through manholes, (b) Junction Manholes, (c) Side Entrance Manholes, (d) Drop Manholes, (e) Scraper (Service) Type Manhole, (f) Flushing manholes.

(ii) Manholes are the essential ancillary structure in any sewerage system. They are provided for inspection, testing, cleaning, repairing and removal of obstruction from sewer line.

(iii) Manhole should be built at every change of alignment, gradient or diameter, at the head of all sewer and branches and at every junction of two or more sewers on sewer, which is to be cleaned manually or which cannot be entered for cleaning or inspection.

(iv) The Maximum spacing of manholes in the sewer are as per CPHHEO manual.

(v) Manhole Covers & frames :-

The covers and frames shall conform to IS 1726 for cast iron and IS 12592 for pre-cast concrete covers and frames. The size of manhole covers should be such that there should be clear opening of not less than 560mm diameter for manholes exceeding 0.9m depths. The frames of manhole shall be firmly embedded to correct alignment and level in plain concrete. After completion of work, manhole covers shall be sealed by means of thick grease.

2 Cement in Sewage structure

The surfaces of structures in contact with sewage such as manhole, chambers, wet well, sump etc. shall be constructed with sulphate resistant cement.

3 Inverted siphon

When it is found necessary to cross obstruction like nallah by sewers line that shall be crossed by Inverted Syphon i.e. by laying the sewer under the obstruction (nallah) and regaining as much elevation as possible after the nallah is passed. As the siphons are depressed below the hydraulic grade line, maintenance of self cleaning velocity at all flows is very important. Two considerations, which govern the profile of a siphon, are provision for hydraulic losses and provisions for cleaning.

4 Storm Water Inlets :-

(i) Storm water inlets are device meant to admit the surface run off to the sewers and form a very important part of the systems. Therefore their location and design shall be given careful considerations.

(ii) Storm water inlets may be categorised under three major groups viz. curb inlets, gutter inlets and combination inlets, each being either depressed or flush depending upon their elevation with reference to the pavement surface.

5 Sewer Ventilators :-

(i) It is necessary to make provision for the escape of air to take care of the exigencies of full flow and also to keep the sewage as fresh as possible especially in outfall sewers. In case of storm sewers providing ventilating manhole covers serves the purpose.

(ii) Ventilating columns/ shafts shall be provided at an interval of 180m in all mains intercepting and outfall sewers, near the manholes.

(iii) The connections of house drains to the sewer shall be allowed without the use of any intercepting trap and thus permitting ventilation of laterals and branch sewers via. House drains and their ventilating pipes.

6 Measurement :-

Manholes shall be enumerated under relevant items. Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel . The depth shall be measured correct to 10mm. The extra depth shall be measured and paid as extra over the specified depth.

7 Rates :-

The rate shall include the cost of the material and labour involved in all the operation described in the items.

8 In case of cast in Situ RCC manholes, the items of RCC, steel, shuttering, footrest, cover & frame ect. shall be paid as per specific items in the respective chapter of ISSR.

9 For cast in Situ and pre cast RCC manholes, the steel for reinforcement shall be as per the provision of IS 456 and IS 3370 Part I, II, & IV.

10 The rates for excavation of trench for laying of sewer line & water line and manhole/ chambers shall cover all site clearances, adequate barricades, construction signs, red lanterns and guards as required, dewatering, scaffolding, timbering, machinery, tools implements and generally of all means used for the fulfillment of these items.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 17 - SEWER APPURTENANCES

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.1	Providing and fixing SW gully trap complete with CI grating, Brick masonry chamber in cement mortar 1:4 (1 cement : 4 fine sand) water tight CI cover with frame of 30x30cm size including necessary Excavation, cement concrete grade M-5 (Nominal Mix) with stone aggregate 40mm nominal size, fixing CI cover with frame in Cement concrete grade M-15 (Nominal Mix) with stone aggregate 20mm nominal size, 12 mm thick cement plaster 1:2 (1 cement: 2 coarse sand) finished with a floating coat of neat cement complete.		
17.1.1	100x100mm size "P" Gully Trap Chamber	Each	1661.00
17.1.2	125x100mm size "p", "Q" or "S" type Gully trap chamber	Each	1725.00
17.1.3	180x150mm size "P" or "S" type	Each	1799.00
17.2	Constructing Brick masonry rectangular manhole in cement mortar 1:4 (1cement:4 fine sand) common Burnt Clay Brick or fly ash bricks, of compressive strength not less than 75 Kgf/cm ² RCC top slab Cement Concrete 1:2:4 (Nominal Mix) with stone aggregate 20mm nominal size, 20 cm thick foundation in cement concrete 1:3:6 (Nominal Mix) with stone aggregate 40mm nominal size, inside & outside plastering minimum 12 mm thick with cement mortar 1:3 (1 cement:3 coarse sand) finished with a floating coat of neat cement and making channels in Cement Concrete 1:2:4 (Nominal Mix) with stone aggregate 20mm nominal size including finishing the channel to shape, including providing and fixing footrest, manhole cover and frame etc. complete. (only excavation as per actual shall be paid separately), Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel. (for reference purpose use Drawing No. 11)		
17.2.1	Man hole with above specifications having inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 450x600 mm clear opening as per IS : 1726 : 1991.	Each	8656.00
17.2.2	Man hole with above specifications having inside size 90x80 cm and 60 cm deep including C.I. cover with frame (light duty) 450x600 mm clear opening as per IS : 1726 : 1991.	Each	9563.00
17.2.3	Man hole with above specifications having inside size 120x90 cm and 90 cm deep including C.I. cover with frame (medium duty) 500 mm clear opening as per IS 1726 : 1991.	Each	18957.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.2.4	Man hole with above specifications having inside size 120x90 cm and 90 cm deep including C.I. cover with frame (heavy duty) 560 mm dia. clear opening as per IS 1726 : 1991.	Each	23716.00
17.2.5	Man hole with above specifications having inside size 120x90 cm and 90 cm deep including SFRC cover with frame (heavy duty) 560 mm dia. clear opening as per IS 12592 : 2002.	Each	14140.00
17.2.6	Man hole for property connection (House connection) in narrow lanes.		
17.2.6.1	Man hole with above specifications having inside size 450x450mm and 900mm deep including SFRC square Man hole Cover and frame (medium Duty) 450mmx 450mm complete.	Each	5813.00
17.2.6.2	Man hole with above specifications having inside size 600x450mm and 900mm deep including SFRC rectangular Man hole Cover and frame (medium Duty) 600mm x 450mm complete.	Each	5854.00
17.3	Add/ deduct for variation of depth of man holes given at item 17.2		
17.3.1	90x80cm size manhole	per meter	5992.00
17.3.2	120x90cm size manhole over item.	per meter	7169.00
17.3.3	45x45cm size manhole	per meter	2020.00
17.3.4	60x45cm size manhole	per meter	4127.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.4	Construction of circular type manhole 900 mm internal dia. at bottom, 560 mm dia at top, depth of manhole 900 mm, common Burnt Clay Bricks or fly ash bricks of compressive strength not less than 75 Kgf/ cm ² with 1:4 cement mortar (1 cement : 4 coarse sand), inside & outside plastering minimum 12 mm thick with cement mortar 1:3 (1 cement:3 coarse sand) finished with a floating coat of neat cement. 20 cm thick foundation in cement concrete 1:3:6 (Nominal Mix) with stone aggregate 40mm nominal size, and making channel in cement concrete 1:2:4 (Nominal Mix) with stone aggregate 20mm nominal size including finishing the channel to shape, including providing and fixing footrest, manhole cover and frame etc. complete. (only excavation as per actual shall be paid separately) fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering etc. complete as per standard drawing. Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel. (as per Drawing No. - 13-A)	Each	7950.00
17.4.1	Extra for increasing depth of manhole mentioned at Item No. 17.4 above 900mm and up to 1650mm. (only excavation as per actual shall be paid separately)	Meter	4524.00
17.5	Construction of circular type manhole 1200 mm internal dia. at bottom, 560 mm dia at top, depth of manhole 1660 mm, common Burnt Clay Bricks or fly ash bricks of compressive strength not less than 75 Kgf/ cm ² with 1:4 cement mortar (1 cement : 4 coarse sand), inside & outside plastering minimum 12 mm thick Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement, 25 cm thick foundation in cement concrete 1:3:6 (Nominal Mix) with stone aggregate 40mm nominal size, and making channel in cement concrete 1:2:4 (Nominal Mix) with stone aggregate 20mm nominal size including finishing the channel to shape, including providing and fixing footrest, manhole cover and frame etc. complete. (only excavation as per actual shall be paid separately) fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering etc. complete as per standard drawing. Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel. (as per Drawing No. - 13-B)	Each	15197.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.6	Extra for increasing depth of manhole mentioned at Item No. 17.5 above 1660 mm and up to 2300 mm . (only excavation as per actual shall be paid separately)	Meter	6210.00
17.7	Construction of circular type manhole 1500 mm internal dia. at bottom, 560 mm dia at top, depth of manhole 2310 mm in common Burnt Clay Bricks or fly ash bricks of compressive strength not less than 75 Kgf/ cm ² with 1:4 cement mortar (1 cement : 4 coarse sand), inside & outside plastering minimum 12 mm thick Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement, 30 cm thick foundation in cement concrete 1:3:6 (Nominal Mix) with stone aggregate 40mm nominal size, and making channel in cement concrete 1:2:4 (Nominal Mix) with stone aggregate 20mm nominal size including finishing the channel to shape, including providing and fixing footrest, manhole cover and frame etc. complete. (only excavation as per actual shall be paid separately) fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering etc. complete as per standard drawing. Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel. (as per Drawing No. - 14-A)	Each	22635.00
17.7.1	Extra for increasing depth of manhole mentioned at Item No. 17.7 above depth 2310 mm and up to 4950 mm (only excavation as per actual shall be paid separately)	per meter	13961.00
17.7.2	Extra for increasing depth of manhole mentioned at Item No. 17.7 above depth 4950 mm and up to 9000mm. (only excavation as per actual shall be paid separately)	per meter	19080.00
17.7.3	Add extra for Providing and fixing CI cover with frame , heavy duty (total wt. of cover and frame to be not less than 208 kg) in place of SFRC cover and frame in item no. 17.4, 17.5, 17.7,17.8	Each	10166.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.8	Construction of circular type manhole 1800 mm internal dia. at bottom, 560 mm dia at top, depth of manhole 9010 mm in common Burnt Clay Bricks or fly ash bricks of compressive strength not less than 75 Kgf/ cm ² with 1:4 cement mortar (1 cement : 4 coarse sand), inside & outside plastering minimum 12 mm thick Cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement, 30 cm thick foundation in cement concrete 1:3:6 (Nominal Mix) with stone aggregate 40mm nominal size, and making channel in cement concrete 1:2:4 (Nominal Mix) with stone aggregate 20mm nominal size including finishing the channel to shape, including providing and fixing footrest, manhole cover and frame etc. complete. (only excavation as per actual shall be paid separately) fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering etc. complete as per standard drawing. Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel. (as per Drawing No. - 14B)	Each	174820.00
17.8.1	Extra for increasing depth of manhole mentioned at Item No. 17.8 above depth 9010 mm and upto 14000 mm. (only excavation as per actual shall be paid separately)	Meter	27299.00
17.9	Providing, fixing and constructing of pre-cast RCC M-40 grade circular manholes with internal dia. 900mm and 1055mm depth, conical piece, wall thickness 125mm, and jointing of circular rings of required height as per depth of manhole below conical piece and having steel reinforcement in all pieces of manhole including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of plastic encapsulated CI/MS foot steps, supply & fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel (as per Drawing No. - 15A,B,C,D) {Note:- Only Excavation as per actual shall be paid separately}	Each	12494.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.9.1	Extra for increasing depth of manhole beyond 1055mm and upto 1254mm with extension piece of internal dia 1000mm as per drawing and direction of Engineer. (Excavation as per actual shall be paid separately)	Meter	6899.00
17.10	Providing, fixing and constructing of pre-cast RCC M-40 grade circular manholes with internal dia. 1200mm and 1255mm depth, conical piece, wall thickness 125mm, and jointing of circular rings of required height as per depth of manhole below conical piece and having steel reinforcement in all pieces of manhole including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of plastic encapsulated CI/MS foot steps, , supply & fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel (as per Drawing No. - 15E,F,G,H) {Note:- Only Excavation as per actual shall be paid separately}	Each	18568.00
17.10.1	Extra for increasing depth of manhole beyond 1255mm and upto 1554mm with extension piece of internal dia 1200mm as per drawing and direction of Engineer. (Excavation as per actual shall be paid separately)	Meter	9135.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.11	<p>Providing, fixing and constructing of pre-cast RCC M-40 grade circular manholes with internal dia. 1500mm and 1555mm depth, conical piece, wall thickness 125mm, and jointing of circular rings of required height as per depth of manhole below conical piece and having steel reinforcement in all pieces of manhole including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of plastic encapsulated CI/MS foot steps, , supply & fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel (as per Drawing No. - 15I,J,K,L)</p> <p>{Note:- Excavation as per actual shall be paid separately}</p>	Each	24395.00
17.11.1	<p>Extra for increasing depth of manhole beyond 1555mm and upto 6000mm with extension piece of internal dia 1500mm as per drawing and direction of Engineer. (Excavation as per actual shall be paid separately)</p>	Meter	11818.00
17.12	<p>Providing, fixing and constructing of pre-cast RCC M-40 grade circular manholes with internal dia. 1800mm and 6000mm depth, conical piece, wall thickness 125mm, and jointing of circular rings of required height as per depth of manhole below conical piece and having steel reinforcement in all pieces of manhole including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of plastic encapsulated CI/MS foot steps, , supply & fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel (as per Drawing No. - 15M,N,O,P)</p> <p>{Note:- Excavation as per actual shall be paid separately}</p>	Each	100241.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.12.1	Extra for increasing depth of manhole beyond 6000mm and upto 14000mm with extension piece of internal dia 1800mm as per drawing and direction of Engineer. (Excavation as per actual shall be paid separately)	Meter	16558.00
17.13	Providing, fixing and constructing of pre-cast RCC M-30 grade circular manholes with internal dia. 900mm and 1055mm depth, conical piece, wall thickness 125mm, and jointing of circular rings of required height as per depth of manhole below conical piece and having steel reinforcement in all pieces of manhole including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of plastic encapsulated CI/MS foot steps, supply & fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel (as per Drawing No. - 15A,B,C,D,) {Note:- Excavation as per actual shall be paid separately}	Each	11954.00
17.13.1	Extra for increasing depth of manhole beyond 1055mm and upto 1254mm with extension piece of internal dia 1000mm as per drawing and direction of Engineer. (Excavation as per actual shall be paid separately)	Meter	6332.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.14	<p>Providing, fixing and constructing of pre-cast RCC M-30 grade circular manholes with internal dia. 1200mm and 1255mm depth, conical piece, wall thickness 125mm, and jointing of circular rings of required height as per depth of manhole below conical piece and having steel reinforcement in all pieces of manhole including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of plastic encapsulated CI/MS foot steps, , supply & fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel (as per Drawing No. - 15E,F,G,H)</p> <p>{Note:- Excavation as per actual shall be paid separately}</p>	Each	17986.00
17.14.1	<p>Extra for increasing depth of manhole beyond 1255mm and upto 1554mm with extension piece of internal dia 1200mm as per drawing and direction of Engineer. (Excavation as per actual shall be paid separately)</p>	Meter	8965.00
17.15	<p>Providing, fixing and constructing of pre-cast RCC M-30 grade circular manholes with internal dia. 1500mm and 1555mm depth, conical piece, wall thickness 125mm, and jointing of circular rings of required height as per depth of manhole below conical piece and having steel reinforcement in all pieces of manhole including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of plastic encapsulated CI/MS foot steps, , supply & fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel (as per Drawing No. - 15I,J,K,L)</p> <p>{Note:- Excavation as per actual shall be paid separately}</p>	Each	23890.00
17.15.1	<p>Extra for increasing depth of manhole beyond 1555mm and upto 6000mm with extension piece of internal dia 1500mm as per drawing and direction of Engineer. (Excavation as per actual shall be paid separately)</p>	Meter	11434.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.16	<p>Providing, fixing and constructing of pre-cast RCC M-30 grade circular manholes with internal dia. 1800mm and 6000mm depth, conical piece, wall thickness 125mm, and jointing of circular rings of required height as per depth of manhole below conical piece and having steel reinforcement in all pieces of manhole including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of plastic encapsulated CI/MS foot steps, , supply & fixing of heavy duty (HD-20) SFRC cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of manhole shall be considered as the vertical distance from top of the manhole cover to the outgoing invert of main drain channel (as per Drawing No. - 15M.N,O.P) {Note:- Excavation as per actual shall be paid separately}</p>	Each	98167.00
17.16.1	<p>Extra for increasing depth of manhole beyond 6000mm and upto 14000mm with extension piece of internal dia 1800mm as per drawing and direction of Engineer. (Excavation as per actual shall be paid separately)</p>	Meter	16029.00
17.17	<p>Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910 on 12mm dia steel bar conforming to IS : 1786 having minimum cross section as 23 mmx25mm and over all minimum length 263 mm and width as 165mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacture's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block grade M-10 (Nominal Mix with 20 mm maximum size of stone aggregate) complete as per design.</p>	Each	268.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.18	Providing MS/CI foot rests and fixing in manhole with CC blocks of Cement concrete grade 1:2:4 (Nominal Mix) with stone aggregate 20 mm nominal size of size 30cm x 20cm x 15cm		
17.18.1	With 20mm square bar/ casting one foot rest	Kg.	90.00
17.18.2	With 20mm round bar foot rest	Kg.	100.00
17.19	Making connection of drain or sewer line with existing service lines manhole including breaking into and making good the walls, floors etc. with cement concrete grade M-15 (Nominal Mix) with stone aggregate 20mm nominal size plastered with Cement Mortar 1:3 (1 Cement : 3 coarse sand) finished with a floating coat of neat cement and making necessary channels etc. complete.		
17.19.1	For 100 to 200 mm dia pipes	Each	494.00
17.19.2	For 250 to 300 mm dia pipes	Each	543.00
17.19.3	For 350 to 450 mm dia pipes	Each	726.00
17.20	Providing SCI drop connection with SCI drop pipe and bend encased all round with Cement concrete grade M-5 (Nominal Mix) with stone aggregate 40mm nominal size including cutting holes and making good with brick work in cement mortar 1:5(1 cement:5 fine sand) plastered with cement mortar 1:3 (1 cement: 3 coarse sand) on inside walls including lead caulked joints and jointing SW pipes & SCI pipes with stiff cement mortar 1:1(1 cement: 1sand) including making required channel etc. complete.		
17.20.1	(i) For 100 mm drop connection	Each	5428.00
17.20.2	(ii) For 150mm dia drop connection	Each	5726.00
17.20.3	(iii) Extra rate for depths of drop more than 60 cm		
17.20.4	(a) 100mm dia Sand cast iron drop connection	Meter	1589.00
17.20.5	(b) 150mm dia Sand cast iron drop connection	Meter	2258.00
17.21	Road Gully Chambers :- Construction of Brick masonry road gully chambers with brick work in cement mortar 1:5 (1 cement: 5 coarse sand) and 12mm plaster 1:3 including foundation in cement concrete grade M-5 (Nominal Mix) with stone aggregate 40mm nominal size Including precast reinforced cement concrete top cover and frame. (As per Drawing No. 18)		
17.21.1	Chamber 45x45x77.5cm with vertical grating 450x100 mm size	Each	4526.00
17.21.2	Chamber 50x45x60cm with horizontal grating 500x450mm	Each	3969.00
17.21.3	Chamber 110 x 50 x 77.5cm with 500x450 mm horizontal and 450x100 mm vertical gratings both.	Each	7414.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.22	Road Gully Chambers / House Service Chamber (HSC)		
	Providing, fixing and constructing of pre-cast RCC M-30 grade rectangle chamber of wall thickness 125mm, and jointing steel reinforcement in all pieces of HSC including cast-in-situ PCC M-10 grade (1:3:6) foundation, PCC M-10 grade benching and channel portion complete with curing, compaction and form work, supplying and fixing of Precast reinforced cement concrete top cover and frame as per IS 12592 fixed in Cement concrete 1:2:4 (nominal mix) with stone aggregate 20mm nominal size including centering and shuttering , steel reinforcement etc. complete in all respect including testing for water tightness, as per specification and the direction of the Engineer, Depth of HSC shall be considered as the vertical distance from top of the HSC cover to the outgoing invert of main drain channel (as per Drawing No. - 26A) {Note:- Excavation as per actual shall be paid separately}		
17.21.1	Chamber 45x45x77.5cm with vertical grating 450x100 mm size	Each	6280.00
17.21.2	Chamber 50x45x60cm with horizontal grating 500x450mm	Each	5360.00
17.21.3	Chamber 110 x 50 x 77.5cm with 500x450 mm horizontal and 450x100 mm vertical gratings both.	Each	8190.00
17.23	Providing & fixing of precast reinforced cement concrete manhole cover and frame including cost of transporting at site and all material etc. complete		
17.23.1	600 x 450 mm medium duty	Each	1791.00
17.23.2	450 x 450 mm medium duty	Each	1501.00
17.23.3	600 x 600 mm medium duty	Each	1966.00
17.23.4	450 mm dia. medium duty	Each	1385.00
17.23.5	500 mm dia. medium duty	Each	1565.00
17.23.6	560 mm dia. medium duty	Each	1733.00
17.23.7	600mm dia. Medium duty	Each	1850.00
17.23.8	450 x 900 mm heavy duty	Each	3708.00
17.23.9	560 x 560 mm heavy duty	Each	2779.00
17.23.10	450 mm dia. heavy duty	Each	2082.00
17.23.11	500 mm dia. heavy duty	Each	2227.00
17.23.12	560 mm dia. heavy duty	Each	2314.00
17.23.13	600 mm dia. heavy duty	Each	2546.00
17.23.14	560 x 900 mm size extra heavy duty	Each	4289.00
17.23.15	560 x 560 mm size extra heavy duty	Each	3418.00
17.23.16	450 mm dia. Extra heavy duty	Each	2663.00
17.23.17	500 mm dia. Extra heavy duty	Each	2837.00
17.23.18	560 mm dia. Extra heavy duty	Each	2953.00
17.23.19	600mm dia. Extra heavy duty	Each	3127.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.24	Providing & fixing of precast reinforced cement concrete manhole cover without frame including cost of transporting at site and all material etc. complete		
17.24.1	600 x 450 mm medium duty	Each	929.00
17.24.2	450 x 450 mm medium duty	Each	798.00
17.24.3	600 x 600 mm medium duty	Each	1007.00
17.24.4	450 mm dia. medium duty	Each	746.00
17.24.5	500 mm dia. medium duty	Each	827.00
17.24.6	560 mm dia. medium duty	Each	903.00
17.24.7	600mm dia. Medium duty	Each	955.00
17.24.8	450 x 900 mm heavy duty	Each	1791.00
17.24.9	560 x 560 mm heavy duty	Each	1373.00
17.24.10	450 mm dia. heavy duty	Each	1060.00
17.24.11	500 mm dia. heavy duty	Each	1125.00
17.24.12	560 mm dia. heavy duty	Each	1164.00
17.24.13	600mm dia. heavy duty	Each	1269.00
17.24.14	560 x 900 mm size extra heavy duty	Each	2053.00
17.24.15	560 x 560 mm size extra heavy duty	Each	1661.00
17.24.16	450 mm dia. Extra heavy duty	Each	1321.00
17.24.17	500 mm dia. Extra heavy duty	Each	1399.00
17.24.18	560 mm dia. Extra heavy duty	Each	1452.00
17.24.19	600mm dia. Extra heavy duty	Each	1530.00
17.25	Providing & fixing in position Cast Iron Manhole Covers and frame conforming to IS-1726. All the exposed edges rounded end finished in cement mortar 1:3 etc. complete.	Kg.	60.00
17.26	Replacement of M.S. foot rests in manholes including dismantling concrete blocks and fixing with 30x20x15 cm cement concrete blocks cement concrete M 10 (Nominal Mix) with stone aggregate 20mm nominal size.		
17.26.1	With 20 mm square bar	Kg.	168.00
17.26.2	With 20 mm round bar	Kg.	246.00

S.No.	Particulars of Items	Unit	Rate (in Rs.)
17.27	Dismantling of manhole including R.C.C. top slab, cover with frame including stacking of useful materials near the site and disposal of unserviceable materials into municipal dumps.		
17.27.1	Circular/ square/ rectangular		
17.27.1.1	upto 45 cm deep	Each	1134.00
17.27.1.2	46 cm to 90 cm deep	Each	1844.00
17.27.1.3	91 cm to 150 cm deep	Each	1889.00
17.27.1.4	151 cm to 250cm deep	Each	2602.00
17.28	Cleaning of sewers		
17.28.1	Pumping out to remove the sewers blockage by using suitable pump sets operated by generators, whole assembly mounted on four wheel trailer/ pickup van including diesel and labour charges etc.	Per KL	89.00
17.28.2	Cleaning of sewers upto 300mm dia by manila rod and cloth ball/ sewer rod/ Roding machine with flexible sewer rods etc. including removal of blockage of manhole complete.	Day	535.00
17.28.3	Cleaning of sewers (all sizes) by jetting machine/ sewer cleaning machine equipped with air and water jetting by removal of blockage of manhole and cleaning sewers manhole to manhole by jetting complete.	Day	2149.00
17.28.4	Removal of debris/malwa collected in manholes by manual means/ mechanical means complete.	Cum	220.00
17.29	Taking out C.I. cover with frame from R.C.C. top slab of manholes of various sizes including demolishing of R.C.C. work manually/ by mechanical means and stacking of useful materials near the site and disposal of unserviceable materials into municipal dumps within 50 meters lead as per direction of Engineer-in-charge.	Each	217.00
17.30	Taking out C.I. cover with frame from R.C.C. top slab of inspection chambers of various sizes including demolishing of R.C.C. work manually/ by mechanical means and stacking of useful materials near the site and disposal of unserviceable materials into municipal dumps within 50 meters lead as per direction of Engineer-in-charge.	Each	128.00

CHAPTER- 18

CIVIL WORKS FOR WATER SUPPLY & SEWERAGE WORKS

- 1 Earth work shall be done as per IS 1200 (Part-1) : 1992(Reaffirmation year 2017)
- 2 Excavation shall be done as per safety codes IS 3764 : 1992(Reaffirmation year 2017)
- 3 Concrete work shall be done as per IS 456 : 2000(Reaffirmation year 2016)

Use of Fly Ash Blended Cements in Cement Concrete (PPCC) in RCC Structures

(a) Subject to General Guidelines detailed out as above, PPC manufactured conforming to IS 1489 (Part-I) shall be treated at par with OPC for manufacture of Design Mix concrete for structural use in RCC

(b) Till the time, BIS makes it mandatory to print the %age of fly ash on each

(c) While using PPC for structural concrete work, no further admixing of fly ash shall be permitted.

- 4 Steel shall be used as per IS standard given below :-
 - 4.1 Mild steel and medium tensile steel bars shall conform to IS :432 (Part-I):1982(Reaffirmation year 2020)
 - 4.2 Hot rolled deformed bars shall conform to IS : 1139:1966
 - 4.3 Cold Twisted bars shall conform to IS : 1786:2008(Reaffirmation year 2018)
 - 4.4 Hard drawn steel wire fabric shall conform to IS : 1566:1982(Reaffirmation year 2020) and
 - 4.5 Rolled steel made from structural steel shall conform to IS : 226:1975
 - 4.6 Thermo Mechanically Treated bars of grade Fe-500D.
- 5 Sand
 - 5.1 Sand is the fine aggregate which is obtained either from natural source like river bank or from pits etc. Sand can also be produce by crushing stone are gravels. It should pass through 4.75 mm IS sieve.
 - 5.2 Sand should be free from clay, dust or silt. The permissible limit for the same is 5% by weight.
 - 5.3 Sand should be free from organic impurities as determined is in accordance with IS : 2386 (Part-II):1963
 - 5.4 For plaster sand used should conform to IS : 1542:1992(Reaffirmation year 2019)
 - 5.5 For masonry work sand used should conform to is : 1661:1972

6 Coarse aggregate

6.1 Coarse aggregate should retain on 4.75 mm IS sieve.

6.2 (a) Uncrushed gravel/Stone obtain from natural sources,

6.3 (b) crushed gravel/stone obtain from crushing of gravel/hard stone or

6.4 (c) partially crushed gravel/stone by mixing of the above two (a & b) is called coarse aggregate.

6.5 It should not contain coal, lignite, pyrites mica , shale, clay, soft fragments, and other organic impurities

6.6 It should not contain any material which is liable to caused detrimental effect on steel reinforcement.

6.7 The maximum quantity of deleterious material should not exceed the limits as shown in table 1 of IS: 383:2016, when tested in accordance with IS:2386:1963.(Reaffirmation year 2016)

6.8 The crushing value of the aggregate should not exceed 45 % when determined in accordance with the IS: 2386 (Part-IV)-1963(Reaffirmation year 2016) for concrete other than wearing surfaces and 30 % for concrete for wearing surfaces such as runways, roads and pavement.

6.9 The coarse aggregate shall satisfy the following requirement of grading.

I.S. Sieve	Percentage by Weight Passing the sieve		
	40 mm	20 mm	12.5 mm
63 mm	100	-----	--
40 mm	95-100	100	--
20 mm	30-70	95-100	100
12.5 mm	---	---	90-100
10 mm	10-35	25-55	40-85

7 Bricks

7.1 Common burnt clay bricks should be as per IS:1077:1992(Reaffirmation year 2016) or IS 13757 classes of Burnt Clay fly ash building bricks.

7.2 Class: Classes of Common Burnt Clay Bricks as under :

Class Designation	Compressive Strength not less than	
	N/mm ²	Kgf/cm ² (aprox)
7.5	7.5	75

8 Mortar

8.1 The mortar mixing shall preferably be done in mechanical mixer operated manually or by power. Hand mixing can be restored to as long as uniform density of the mix and its strength are assured subject to prior approval of Engineer-in-charge.

8.2 Hand mixing operation, if permitted, carried out on clean water tight platform when cement and sand shall be first mixed dry in required proportion several times till the mixture is of uniform. Minimum quantity of water shall be added to bring the mortar to the consistency of stiff paste.

8.3 Mortar shall be mixed only in such quantity as required for immediate use. The mortar normally be considered to use within 30 minutes. Mortar remains unused after 30 minutes shall be rejected and removed from site.

9 Plaster

Plastering shall be done where shown on as per drawing. Plastering shall be started from top and worked down. Wooden screeds 75mm wide and of the thickness of the plaster shall be fixed vertically 2.5 to 4 meter. apart to act as gauge and guide in applying plaster. The mortar shall be laid on the wall between the screeds using the plasters float and pressing the mortar so that packed joints are properly filled. The plaster shall there be finished off with a wooden straight edge reaching across the screeds. The straight edge shall be worked on the screeds with small upward and side ways motion 50mm to 75mm at a time. Finally, the surface shall be finished off with a plasters wooden float. Metal floats shall not be used.

Curing shall be commenced as soon as mortar used for finishing has hardened sufficiently and not to be damaged during curing. It shall be kept wet for a period of at least 7 days.

10 Form work :-

10.1 Form work shall include all temporary form for forming concrete of shape with all props, staging, centering required for support.

10.2 All material shall confirm to relevant I.S. specifications

10.3 Form work shall be constructed with metal or timber, for metal all bolts should be counter sunk.

10.4 The form work should be robust and strong and joint shall be leak proof. Staging must have cross bracing and diagonal bracing in both direction.

10.5 The rates include provision of gradient in form work for terrace roof and gradient shall be provided necessarily for water drained out quickly and effectively. Concrete shall not be freely dropped into place from height exceeding 1.50 meter. And it shall be compacted in its final position within 30 minutes of its discharge from mixer. It shall be compacted thoroughly by vibration or other means during placing so as to produce a dense homogenous void free mass having required surface finish.

10.6 No plaster is permitted on the concrete surface. Bottom and side surfaces shall give a uniform in textured smooth surface and good appearance. Concrete having rough non-uniform texture and honey combing in more than 5% area shall be rejected and payment for the form work shall not be made.

11 Measurements :-

Measurements shall be taken for complete finished item as per details given in specification.

Excavation of trench for water, sewer line width shall be as per drawing No. 26

12 Rates :-

Rates include labour, material equipment and machineries required for completion of items.

13 The rates for excavation of trench for laying of sewer line & water line and manhole/ chambers shall cover all site clearances, adequate barricades, construction signs, red lanterns and guards as required, dewatering, scaffolding, timbering, machinery, tools implements and generally of all means used for the fulfillment of these items.

13.1 for Carriage of material, the rates shall be applied as per Chapter -1, Volume 2 of ISSR 2021.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 18 - Civil Works for Water Supply & Sewerage works.

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.1	Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including disposal of excavated earth upto 50 m and lift upto 1.5 m, disposed soil to be levelled and neatly dressed.		
18.1.1	All kinds of ordinary soil	Sqm	38.00
18.2	Earth work in excavation for foundation, trenches for pipes / cables or drains etc. by mechanical means / manual means (exceeding 30cm in depth.) including ramming of bottom, dressing of sides, disposal of excavated earth including of all lift and lead upto 50m. Disposed earth to be levelled and neatly dressed.		
18.2.1	All kinds of ordinary soil	Cum	151.00
18.2.2	Ordinary rock	Cum	261.00
18.2.3	Hard rock (requiring blasting)	Cum	405.00
18.2.4	Hard rock (blasting prohibited)	Cum	559.00
18.2.5	Extra for every additional lift of 1.5m or part thereof over item 16.2 (Note: Only for depth of trench exceeding 1.5m for laying of sewer line & water line and manhole/ chambers including all site clearances, adequate barricades, construction signs, red lanterns and guards as required, dewatering, scaffolding, timbering, machinery, tools implements and generally of all means used for the fulfillment of these items.)		20% extra of the rate of excavation
18.2.6	Extra for every additional lead upto 1 km item 18.1 to 18.2	Cum	92.87
18.2.6.1	Extra for every additional lead above 1 km, refer Chapter 1 of ISSR 2021 Volume 2: Building Works.		
18.2.7	Extra rates for quantities of works, executed in difficult conditions: (The extra percentage rate is applicable in respect of each item but limited to quantities of work executed in these difficult conditions).		
18.2.7.1	In or under water and/or liquid mud, including pumping out water as required.(All water that may accumulate in excavations during the progress of the work from seepage, (not due to the negligence of the contractor), shall be bailed, pumped out or otherwise removed. The contractor shall take adequate measures for bailing and/or pumping out water from excavations and/or pumping out water from excavations and construct diversion channels, bunds, sumps, etc)		(20% extra of the rate of each item. The extra percentage in rate is applicable, to quantities of ,work excuted,in difficult condition.)

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.2.7.2	In or under foul position, including pumping out water as required.(Excavation, where sewage, sewage gases or foul conditions are met with from any source, shall fall in this category. Decision of the. Engineer-in-Charge whether the work is in foul position or not shall be final.)		(20% extra of the rate of each item. The extra percentage in rate is applicable, to quantities of ,work excuted,in difficult condition.)
18.2.8	Filling by available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.	Cum	89.00
18.3	Extra for every additional lift of 1.5 m or part thereof in.		
18.3.1	All kinds of soil.	Cum	37.00
18.3.2	Ordinary or hard rock.	Cum	66.00
18.3.3	Filling with moorum for pipe bedding or over the pipe including supply of moorum/sand	Cum	720.00
18.4	Demolishing stone masonry manually/by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50meters lead as per direction of Engineer-in-charge:		
18.4.1	In lime mortar	Cum	282.00
18.4.2	In cement mortar	Cum	560.00
18.5	Demolishing cement concrete manually/by mechanical means including disposal of material within 50 meters lead as per direction of Engineer-in-charge.		
18.5.1	1:3:6 or richer mix	Cum	534.00
18.5.2	1:4:8 or leaner mix	Cum	389.00
18.6	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-charge.	Cum	786.00
18.7	Extra for cutting reinforcement bars manually/by mechanical means in R.C.C. (Payment shall be made on the cross sectional area of R.C.C. or as per direction of Engineer -in-charge.	Sqm	291.00
18.8	Extra for scrapping, cleaning and straightening reinforcement from R.C.C.	Kg	3.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.9	Demolishing brick work manually/by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-charge.		
18.9.1	In lime mortar	Cum	218.00
18.9.2	In cement mortar	Cum	437.00
18.10	Dismantling stone slab flooring laid in cement mortar including stacking of serviceable material and disposal of unserviceable material within 50 meters lead.	Sqm	79.00
18.11	Dismantling of flexible pavements and disposal of dismantled materials up to a lead of 1000 meter, stacking serviceable and unserviceable materials separately and as per relevant clauses of section-200.		
18.11.1	Bituminous courses	Cum	420.00
18.11.2	Granular courses	Cum	378.00
18.12	Dismantling of cement concrete pavement i/c breaking to pieces not exceeding 0.02 cum in volume and stock piling at designated locations and disposal of dismantled materials up to a lead upto 1000 meter, stacking serviceable and unserviceable materials separately and as per relevant clauses of section-200.	Cum	749.00
18.13	Dismantling D.I. pipes including excavation and refilling trenches after taking out the pipes, manually/ by mechanical means making into blocks including stacking of pipes & lead at site within 50 metre lead as per direction of Engineer-in-charge.		
18.13.1	Upto 150 mm diameter	Meter	285.00
18.13.2	Above 150 mm dia upto 300 mm dia	Meter	598.00
18.13.3	Above 300mm diameter	Meter	969.00
18.14	Providing and laying in position Plain cement concrete (PCC) of specified grade excluding the cost of centering and shuttering		
18.14.1	Cement concrete grade M-30 (Design Mix) with 20 mm maximum size of stone aggregate	Cum	5839.00
18.14.2	Cement concrete grade M-25 (Design Mix) with 20 mm maximum size of stone aggregate	Cum	5647.00
18.14.3	Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	5178.00
18.14.4	Cement concrete grade M-15 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	4755.00
18.14.5	Cement concrete grade M-10 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	4219.00
18.14.6	Cement concrete grade M-15 (Nominal Mix) with 40 mm maximum size of stone aggregate	Cum	4663.00
18.14.7	Cement concrete grade M-10 (Nominal Mix) with 40 mm maximum size of stone aggregate	Cum	4112.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.14.8	Cement concrete grade M-7.5 (Nominal Mix) with 40 mm maximum size of stone aggregate	Cum	3793.00
18.14.9	Labour rate for Item No.- 18.14.1 to 18.14.8	Cum	827.00
18.14.10	1:2:3½:9 (1 ordinary portland cement : 2 Fly ash : 3½ coarse sand : 9 graded stone aggregate 40 mm nominal size)	Cum	3611.00
18.14.11	1:2½:4:11 (1 ordinary portland cement : 2½ fly ash : 4 coarse sand : 11 graded stone aggregate 40 mm nominal size)	Cum	3293.00
18.15	Providing and laying in position M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate of reinforced cement concrete excluding the cost of centering, shuttering, finishing and reinforcement	Cum	5435.00
18.16	Providing and laying in position machine batched and machine mixed , and machine vibrated design mix reinforced cement concrete of M-25 grade mixed in a concrete mixer of not less than 0.2 cum capacity and appropriate weigh batch using approved mix design , for reinforced cement concrete work including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement including Admixtures in recommended proportions as per IS 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.		
18.16.1	Upto Plinth level	Cum	5547.00
18.16.2	Above Plinth upto floor 2 level	Cum	5701.00
18.17	Extra for richer mixes at all floor levels		
18.17.1	Providing M-30 grade concrete instead of M-25 grade Batch mix concrete (BMC)	Cum	66.00
18.17.2	Providing M-35 grade concrete instead of M-25 grade Batch mix concrete	Cum	131.00
18.17.3	Providing M-40 grade concrete instead of M-25 grade Batch mix concrete	Cum	197.00
18.18	Providing and laying in position ready mix M-25 grade concrete for reinforced cement concrete work , using cement content as per approved design mix , manufactured in fully automatic batching Plant and transported to site of work in transit mixer for all leads having continuous agitated mixer including pumping of ready mix concrete from transit mixer to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including cost of Admixtures in recommended proportions as per IS 9103 to accelerate/retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.		
18.18.1	Upto Plinth level	Cum	5826.00
18.18.2	Above Plinth upto floor 2 level	Cum	5980.00
18.19	Extra for richer mixes at all floor levels		

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.19.1	Providing M-30 grade concrete instead of M-25 grade Ready mix concrete (RMC)	Cum	66.00
18.19.2	Providing M-35 grade concrete instead of M-25 grade Ready mix concrete	Cum	131.00
18.19.3	Providing M-40 grade concrete instead of M-25 grade Ready mix concrete	Cum	197.00
18.20	Extra for RCC/BMC/RMC all works above floor 2 level for each floors or part thereof.	Cum	49.00
18.21	Extra for laying reinforced cement concrete in or under foul positions.	Cum	64.00
18.22	Extra for laying reinforced cement concrete in or under water and/ or liquid mud including cost of pumping or bailing out water and removing slush etc., complete.	Cum	270.00
18.23	Reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding upto floor level including cost of binding wire, wastage and over laps upto 12mm horizontal/ inclined position of reinforcement bars in slab and beams, plinth, chajjas, lintels, upto 4.5m vertical length of reinforcement in wall columns (over laps shall be provided as per requirement of IS : 13920; IS 456 & SP : 34) etc. complete.		
18.23.1	Mild steel and Medium Tensile steel bars.	kilogram	57.00
18.23.2	Hot rolled deformed bars	kilogram	58.00
18.23.3	Cold twisted bars	kilogram	57.00
18.23.4	Thermo-Mechanically Treated bars. (Fe 500 D or more)	kilogram	58.00
18.23.5	Hard drawn steel wire	kilogram	57.00
18.23.6	Hard drawn steel wire fabric	kilogram	65.00
18.23.7	Add extra for providing reinforcement above Floor two level for every additional floor or part there of.	kilogram	1% of the respective item
18.24	CEMENT MORTAR		
18.24.1	Cement Mortar 1:1 (1 cement : 1 sand)	cum	6733.00
18.24.2	Cement mortar 1:2 (1 cement : 2 sand).	cum	5146.00
18.24.3	Cement mortar 1:3 (1 cement : 3 sand).	cum	4360.00
18.24.4	Cement mortar 1:4 (1 cement : 4 sand).	cum	3646.00
18.24.5	Cement mortar 1:5 (1 cement : 5 sand).	cum	3262.00
18.24.6	Cement mortar 1:6 (1 cement : 6 sand).	cum	2933.00
18.24.7	Cement mortar 1:2 (1 cement : 2 coarse sand).	cum	5722.00
18.24.8	Cement mortar 1:3 (1 cement : 3 coarse sand).	cum	5010.00
18.24.9	Cement mortar 1:4 (1 cement : 4 coarse sand).	cum	4298.00
18.24.10	Cement mortar 1:5 (1 cement : 5 coarse sand).	cum	3915.00
18.24.11	Cement mortar 1:6 (1 cement : 6 coarse sand).	cum	3587.00
18.24.12	Cement mortar 1:2 (1 cement : 2 stone dust).	cum	4774.00
18.24.13	Cement mortar 1:2 (1 cement : 2 marble dust).	cum	5058.00
18.24.14	Cement mortar 1:5 (1 cement : 5 marble dust).	cum	3162.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.24.15	White cement mortar 1:2 (1 white cement : 2 marble dust).	cum	9062.00
18.24.16	White cement mortar 1:3 (1 white cement : 3 marble dust).	cum	7270.00
18.24.17	White cement mortar 1:5 (1 white cement : 5 marble dust).	cum	5000.00
18.24.18	Mortar in lime, surkhi (50% Red & 50% Light Yellow) and marble dust (1:1.5:0.5)	cum	2200.00
18.25	Brick work with well burnt chimney bricks in bulls patent trench kiln manufactured by ghol process, crushing strength not less than 40kg /sqcm and water absorption not more than 15% in foundation and plinth.		
18.25.1	Cement mortar 1:4(1 cement : 4 coarse sand)	Cum	5030.00
18.25.2	Cement mortar 1:6(1 cement : 6 coarse sand)	Cum	4824.00
18.26	Brick work with well burnt chimney bricks in bulls patent trench kiln ,crushing strength not less than 25kg /sqcm and water absorption not more than 20% in foundation and plinth		
18.26.1	Cement mortar 1:4(1 cement : 4 coarse sand)	Cum	4435.00
18.26.2	Cement mortar 1:6(1 cement : 6 coarse sand)	Cum	4229.00
18.27	Brick work with chimney brick of class designation 40 Kgf/Cm ² in foundation and plinth level including the cost of scaffolding in :		
18.27.1	Cement mortar 1:4(1 cement : 4 coarse sand)	Cum	5138.00
18.27.2	Cement mortar 1:6(1 cement : 6 coarse sand)	Cum	4612.00
18.28	Brick work with chimney brick of class designation 40 Kgf/Cm ² in superstructure above plinth level and upto floor 2 level including the cost of scaffolding in :		
18.28.1	Cement mortar 1:4(1 cement : 4 coarse sand)	Cum	5209.00
18.28.2	Cement mortar 1:6(1 cement : 6 coarse sand)	Cum	4975.00
18.29	Half brick masonry with class designation 40 Kgf/Cm ² in foundation and plinth in.		
18.29.1	Cement mortar 1:3 (1 cement : 3 coarse sand)	Sqm	575.00
18.29.2	Cement mortar 1:4 (1 cement : 4 coarse sand)	Sqm	552.00
18.30	Half brick masonry with class designation 40 Kgf/Cm ² in super structure above plinth level up to floor 2 level including the cost of scaffolding.		
18.30.1	Cement mortar 1:3 (1 cement : 3 coarse sand)	Sqm	594.00
18.30.2	Cement mortar 1:4 (1 cement : 4 coarse sand)	Sqm	566.00
18.31	Extra for half brick masonry in superstructure, above floor 2 level for every floors or part thereof by mechanical means by lifting material using mobile crane.	Sqm	11.00
18.32	Brick work with Common burnt clay bricks of class designation 75 Kgf/Cm ² in foundation and plinth level including the cost of scaffolding in :		
18.32.1	Cement mortar 1:4(1 cement : 4 coarse sand)	Cum	5431.00
18.32.2	Cement mortar 1:6(1 cement : 6 coarse sand)	Cum	4905.00
18.33	Brick work with Common burnt clay bricks of class designation 75 Kgf/Cm ² in superstructure including the cost of scaffolding in :		
18.33.1	Cement mortar 1:4(1 cement : 4 coarse sand)	Cum	5501.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.33.2	Cement mortar 1:6(1 cement : 6 coarse sand)	Cum	5003.00
18.34	Extra for providing and placing in position 2 Nos. 8mm dia. M.S. / HYSD bars at every third course of half brick masonry.	Sqm	66.00
18.35	Brick work will well burnt open bhatta bricks crushing strength not less than 25kg/cm ² and water absorption not more than 20% in foundation and plinth In CM 1:6.	Cum	3868.00
18.36	Brick work will well burnt open bhatta bricks crushing strength not less than 25kg/cm ² and water absorption not more than 20% in above plinth level upto floor two level in CM 1:6.	Cum	4155.00
18.37	Add Extra from item No.16.32 & 16.33 if Mortar used 1:4 instead of 1:6.	cum	345.00
18.38	Half brick masonry with open bhatta of class designation 25 Kgf/cm ² in foundation and plinth including the cost of scaffolding :		
18.38.1	Cement mortar 1 : 3 (1 cement : 3 coarse sand)	sqm	490.00
18.38.2	Cement mortar 1 : 4 (1 cement : 4 coarse sand)	sqm	467.00
18.39	Half brick masonry with open bhatta of class designation 25 Kgf/cm ² in superstructure above plinth level upto floor 2 level including the cost of scaffolding.		
18.39.1	Cement mortar 1 : 3 (1 cement : 3 coarse sand)	sqm	517.00
18.39.2	Cement mortar 1 : 4 (1 cement : 4 coarse sand)	sqm	494.00
18.40	Brick work with modular fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 50 Kgf/cm ² average compressive strength in superstructure level up to plinth level including the cost of scaffolding : Cement Mortar 1:4	Cum	4531.00
18.41	Brick work with modular fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 50 Kgf/cm ² average compressive strength in superstructure above plinth level up to floor 2 level including the cost of scaffolding :		
18.41.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	4789.00
18.41.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4607.00
18.42	Half Brick work with modular fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 50 Kgf/cm ² average compressive strength in superstructure above plinth level up to floor 2 level including the cost of scaffolding :		
18.42.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	sqm	619.00
18.42.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	sqm	596.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.43	Brick work with modular fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 75 Kgf/CM ² average compressive strength in superstructure level up to plinth level including the cost of scaffolding :		
18.43.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	4734.00
18.43.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4552.00
18.44	Brick work with modular fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 75 Kgf/CM ² average compressive strength in superstructure above plinth level up to floor 2 level including the cost of scaffolding :		
18.44.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	4992.00
18.44.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4810.00
18.45	12 mm cement plaster of mix :		
18.45.1	1:4 (1 cement: 4 sand)	Sqm	149.00
18.45.2	1:6 (1 cement: 6 sand)	Sqm	137.00
18.46	15 mm cement plaster on rough side of single or half brick wall of mix		
18.46.1	1:4 (1 cement: 4 sand)	Sqm	174.00
18.46.2	1:6 (1 cement: 6 sand)	Sqm	159.00
18.47	20 mm cement plaster of mix :		
18.47.1	1:4 (1 cement: 4 sand)	Sqm	212.00
18.47.2	1:6 (1 cement: 6 sand)	Sqm	194.00
18.48	12 mm cement plaster finished with a floating coat of neat cement of mix :		
18.48.1	1:3 (1 cement: 3 sand)	Sqm	181.00
18.48.2	1:4 (1 cement: 4 sand)	Sqm	169.00
18.49	15 mm cement plaster on rough side of single or half brick wall finished with a floating coat of neat cement of mix :		
18.49.1	1:3 (1 cement: 3 sand)	Sqm	206.00
18.49.2	1:4 (1 cement: 4 sand)	Sqm	191.00
18.5	20mm cement plaster 1:3(1 cement : coarse sand) finished with coat of neat cement	Sqm	262.00
18.51	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement: 5 coarse sand) finished with a top layer 6mm thick cement plaster 1:4 (1 cement: 4 fine sand).	Sqm	206.00
18.52	Neat cement punning	Sqm	30.00
18.53	CONSTRUCTION OF STOP DAM / ANICUT / BARRAGE / OTHER RAW WATER RETAINING STRUCTURES		
18.53.1	Labour only for fixing in position single steel shutter for stop dam including all handling, cleaning of grooves i.e. removal of foreign materials such as dust, sand, silt etc. including greasing, oiling where ever required , excluding cost of all materials & staking at site. (Over all dimension of shutters to be considered.)	Sqm	86.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.53.2	Labour only for removing single steel shutter for stop dam including all handling, unscrewing, oiling where ever required ,excluding cost of all materials & staking at site. (Over all dimension of shutters to be considered.)	Sqm	86.00
18.53.3	Labour only for fixing in position the steel/wooden karri shutters for stop dam excluding filling the puddle earth but including all handling ,cleaning of grooves of foreign materials such as dust, sand, silt etc. including greasing, oiling where ever required ,excluding cost of all materials. (Over all dimension of karri shutters to be considered.)	Sqm	82.00
18.53.4	Labour only for removing the steel/wooden karri shutters for stop dam without removal of puddle earth but including handling , unscrewing ,oiling where ever necessary excluding cost of all materials & stacking at site. (Over all dimension of karri shutters to be considered.)	Sqm	82.00
18.53.5	Detailed Geo referenced topographical mapping and development of graphic database for any selected area using digital state of art total station G.P.S., Automatic levels etc. including transfer of entire area data to computer system in different Geo referenced layer/themes using features of standard software compatible with urban area project system design software package including supply of soft copies and hard copies in appropriate state.	Hect.	182.00
18.53.6	Catchment area survey –		
	(a) Chain and compass survey along ridge line by Departmental Officer	km	1733.00
	(b) Leveling along ridgeline and cross-sections.	km	1070.00
18.53.7	Providing & fixing of stop dam Kari shutters each of 40 to 60 cm height and width as per size of opening of Anicut / stop dam / Barrage / Weir, according to specific requirement of engineer in charge (for height & width of shutter). Kari shutters shall be fabricated with 3mm thick MS sheet on frame of MS angle 35x35x5mm size with two diagonal stiffeners of MS angle 35x35x5mm. For shutter having width more than 1.00m, one extra horizontal stiffener of MS angle size 35x35x5mm shall be provided at center, including priming coat on shutter complete. The rate of shutter includes filling the space between Kari shutter by B.C. soil with watering and ramming. (where the static head of water is less than or equal to 3 m)	Kg	67.00

S.No.	Particulars of Items	Unit	Rates (in Rs.)
18.53.8	Design, Drawing, fabrication, supply, erection, testing and commissioning of Vertical lift sliding type Dam Shutter gates interchangeable consisting of ,sealing frame(embedded parts),skin plate of shutters, stiffeners, horizontal and vertical girders, guide, stainless steel flat, lifting hooks, clits fasteners etc., with all accessories including frame & gate complete set for Anicut / Barrage / Stop dam / waste weir /spillway including cost of all materials, machinery, labour, cutting, aligning, welding, finishing, cleaning, tools and tackles, seal fixing, applying one coat of zinc rich epoxy primer and three coats of cold applied coal tar epoxy paint, including primer coating, should not be less than 350 microns., etc. complete as per specifications and approved drawings, including packing & forwarding, transportation charges for structural steel components and other materials. (where the static head of water is more then 3 m)	Kg	102.00
18.54	Cutting Kharanja road and making good the same including supply of extra quantities of Kharanja, moorum.	Sqm	703.00

CHAPTER- 19 MISCELLANEOUS

- 1 The works to be executed in accordance with the General specifications of the Urban Administration & Development Department, relevant IS codes for pipes/specials, jointing materials and laying works.
- 2 All materials shall conform to relevant ISS.
- 3 Where cracked pipe or cut piece is required to be used on line to take a tyton ring joint, it is necessary to cut the cracked portion and chamfer the pipe. In a cut piece, only chamfering would be required. These rates have been introduced separately for cutting and chamfering. The rates include requirement of tools and plants, lead and lift etc.
- 4 During the course of execution, it sometimes becomes necessary to provide a non-standard special to fit into the pipeline. This can be conveniently made out of steel plates. An item to cover such emergency is also provided for in the schedule. Similarly, item to provide a mild steel flange has also been introduced to over the specific requirement during execution.
- 5 An item for laying and jointing steel pipes, incorporating field welding has also been introduced to cover the special requirements during execution.
- 6 All pavements, paved foot paths, curbing, gutters, shrubbery, fences, poles, rod or other property and surface structures removed or disturbed as a part of the work shall be restored to a condition equal to that before the work began, furnishing all labour and material incidental thereto. In restoring the pavement sound materials may be reuse. No Permanent pavement shall be restored unless and until, in the opinion of the Engineer in charge the condition of the backfill is such as to properly support the pavement.
- 7 Pavement and road surface may be removed as a part of the trench excavation and the amount removed shall depend upon the width of trench specified for the installation of the pipe and the width and length of the pavement area required to be removed for laying pipes. The width of pavement removal along the normal trench for the installation of the pipe shall not exceed the width of the trench specified by more then 15 cm on each side of the trench. Wherever in the opinion of the Engineer in charge existing conditions make it necessary or advisable to remove additional pavement, it shall be removed as directed by the Engineer in charge.

- 8 All construction material, and all tools and temporary structures shall be removed from the site as directed by the Engineer in charge. All dirt, rubbish and excess earth from the excavation shall be taken off to a specified dumping site as directed by Engineer in Charge and the construction site shall be kept clean to the satisfaction of the Engineer-in-charge.
- 9 Where any pavement, shrubbery, fence, poles or other property and surface structures have been damaged, removed or disturbed during the course of the work, such property and surface structures shall be replaced or repaired after completion of work.
- 10 Measurements
Measurement shall be made according to the work actually done and pavement shall be made accordingly.
- 11 Rates :
The rate shall include the cost of the material and labour involved in all the operation described in the items. The rates include all plants, chain, pulley blocks, other appliances etc. required for execution of the works. Rates for items and making good roads etc. include lead for the materials.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 19 - MISCELLANEOUS

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.1	Labour for cutting following cast iron pipes of any type and class.		
19.1.1	80 mm dia.	Per Cut	42.00
19.1.2	100 mm dia.	Per Cut	54.00
19.1.3	150 mm dia.	Per Cut	97.00
19.1.4	200 mm dia.	Per Cut	129.00
19.1.5	250 mm dia.	Per Cut	162.00
19.1.6	300 mm dia.	Per Cut	228.00
19.1.7	350 mm dia.	Per Cut	258.00
19.1.8	400 mm dia.	Per Cut	294.00
19.1.9	450 mm dia.	Per Cut	323.00
19.1.10	500 mm dia.	Per Cut	395.00
19.1.11	600 mm dia.	Per Cut	452.00
19.1.12	700 mm dia.	Per Cut	491.00
19.1.13	750 mm dia.	Per Cut	521.00
19.1.14	800 mm dia.	Per Cut	599.00
19.1.15	900 mm dia.	Per Cut	646.00
19.1.16	1000mm dia	Per Cut	690.00
19.2	Labour for cutting following Asbestos Cement Pressure Pipes of any type and class.		
19.2.1	80 mm dia.	Per Cut	21.00
19.2.2	100 mm dia.	Per Cut	28.00
19.2.3	150 mm dia.	Per Cut	53.00
19.2.4	200 mm dia.	Per Cut	71.00
19.2.5	250mm dia	Per Cut	85.00
19.2.6	300mm dia	Per Cut	116.00
19.2.7	350mm dia	Per Cut	132.00
19.3	Labour for cutting following Ductile iron pipes of any type and class.		
19.3.1	80 mm dia.	Per Cut	39.00
19.3.2	100 mm dia.	Per Cut	49.00
19.3.3	150 mm dia.	Per Cut	90.00
19.3.4	200 mm dia.	Per Cut	119.00
19.3.5	250 mm dia.	Per Cut	148.00
19.3.6	300 mm dia.	Per Cut	211.00
19.3.7	350 mm dia.	Per Cut	234.00
19.3.8	400 mm dia.	Per Cut	263.00
19.3.9	450 mm dia.	Per Cut	292.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.3.10	500 mm dia.	Per Cut	350.00
19.3.11	600 mm dia.	Per Cut	412.00
19.3.12	700 mm dia.	Per Cut	438.00
19.3.13	750 mm dia.	Per Cut	467.00
19.3.14	800 mm dia.	Per Cut	524.00
19.3.15	900 mm dia.	Per Cut	581.00
19.3.16	1000mm dia	Per Cut	618.00
19.4	Labour for cutting following Galvanised iron (MS) pipes of any type and class.		
19.4.1	15 mm dia.	Per Cut	7.00
19.4.2	20 mm dia.	Per Cut	11.00
19.4.3	25 mm dia.	Per Cut	16.00
19.4.4	32 mm dia.	Per Cut	18.00
19.4.5	40 mm dia.	Per Cut	23.00
19.4.6	50 mm dia.	Per Cut	27.00
19.4.7	65 mm dia.	Per Cut	32.00
19.4.8	80 mm dia.	Per Cut	34.00
19.4.9	100 mm dia.	Per Cut	42.00
19.4.10	125 mm dia.	Per Cut	48.00
19.4.11	150 mm dia.	Per Cut	53.00
19.5	Labour for cutting following P.V.C pipes of any type and class.		
19.5.1	90mm dia	Per Cut	9.00
19.5.2	110mm dia	Per Cut	13.00
19.5.3	140mm dia	Per Cut	24.00
19.5.4	160mm dia	Per Cut	25.00
19.5.5	180mm dia	Per Cut	29.00
19.5.6	200mm dia	Per Cut	32.00
19.6	Chamfering cast iron pipes of all types and classes to make suitable for tyton joints.		
19.6.1	80mm to150 mm dia.	Per End	692.00
19.6.2	200 mm dia.	Per End	856.00
19.6.3	250 mm dia.	Per End	951.00
19.6.4	300 mm dia.	Per End	1060.00
19.6.5	400 mm dia.	Per End	1228.00
19.6.6	450 mm dia.	Per End	1400.00
19.6.7	500 mm dia.	Per End	1499.00
19.6.8	600 mm dia.	Per End	1658.00
19.6.9	700 mm dia.	Per End	1903.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.6.10	750 mm dia.	Per End	2039.00
19.6.11	800 mm dia.	Per End	2310.00
19.6.12	900 mm dia.	Per End	2433.00
19.6.13	1000 mm dia.	Per End	2677.00
19.7	Dismantling following old cast iron socket and spigot pipes class 'L.A.' 'A' & 'B' including breaking lead caulked joints, melting of lead and making it in to blocks including stacking of pipes at site lead upto 50 meters.		LA
19.7.1	80 mm dia.	RM	8.00
19.7.2	100 mm dia.	RM	10.00
19.7.3	125 mm dia.	RM	14.00
19.7.4	150 mm dia.	RM	17.00
19.7.5	200 mm dia.	RM	23.00
19.7.6	250 mm dia.	RM	32.00
19.7.7	300 mm dia.	RM	42.00
19.7.8	350 mm dia.	RM	51.00
19.7.9	400 mm dia.	RM	62.00
19.7.10	450 mm dia.	RM	72.00
19.7.11	500 mm dia.	RM	83.00
19.7.12	600 mm dia.	RM	111.00
19.7.13	700 mm dia.	RM	138.00
19.7.14	750 mm dia.	RM	155.00
19.7.15	800 mm dia	RM	174.00
19.7.16	900 mm dia	RM	199.00
19.7.17	1000 mm dia.	RM	249.00
19.8	Manufacturing and supply of specials made out of M.S. steel plate or HR coil conforming to IS 3589-2001 or its latest revision/amendment, 5mm to 6mm thick plate in shapes and sizes required as per site conditions including cost of steel plate & other electrical & mechanical material, including Submerged Arc welded, including cost of transportation, loading and unloading complete approved by Engineer-in-Charge. (This is applicable only when standard special are not available).	Kg.	93.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.9	Manufacturing, providing and supplying spirally welded/ERW/SAW/ fabricated M.S. Pipes (Commercial Quality) including procurements of plates, gas cutting to required size rolling, tack welding assembling in suitable lengths to form pipes, welding on automatic welding machine and forming "V" edge on both ends of pipes railway freight, insurance unloading from railway wagon, loading into truck, transport to stores /site unloading, stacking etc, complete as per IS 3589 and IS 5504 as applicable as per specifications (No negative tolerance in thickness is permissible).	Kg	83.00
19.10	Labour only for fixing in position Cast Iron Manhole Covers & frame conforming to IS-1726.	Kg.	6.00
19.11	Provision of public stand posts.		
19.11.1	Providing and constructing two stand post as per type design with excavation 15 cm thick PCC 1:3:6 bedding 20 mm thick PCC 1:2:4 convert for platform of 1.75 M dia. with side curb and bucket rest, 80 mm dia , heavy duty GI pipe central post duly filled therein with C.C. 1:2:4, 2.4 M long, 20mm dia medium G.I. pipe from point of tapping to stand post additional 20mm dia G.I. pipe 6 m long fixed up to 15 mm dia self closing water taps, one brass ferule etc. complete together with all labour and material charges as per drawing and as directed by Engineer-in-charge when good foundation in available. Rate includes draining arrangement by excavating open gutters complete. (Drawing No.- 22)	Each	5400.00
19.11.2	Providing and constructing two taps stand post as per type design with excavation 30 cm thick boulder filling 15 cm thick PCC in 1:3:6 , 20 mm thick RCC 1:2:4 platform of 1.75 M dia. with side curb and bucket rest, 80 mm dia, heavy duty GI pipe central post duly filled therein with C.C. 1:2:4, 2.4 M long, 20mm dia medium G.I. pipe 6 m long fixed up to two 15 mm dia self closing water taps, one brass ferule etc. complete together with all labour and material charges as per directed by Engineer-in-charge when B.C. soil is available. Rate includes draining arrangement by excavating open gutters complete. (Drawing No.-23)	Each	5794.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.12	Disinfecting C.I./D.I. water mains by flushing with water containing bleaching powder at 0.5 gms per liter of water and cleaning the same with fresh water, operation to be repeated three times including getting the sample of water from the disinfected main tested in the Govt. / Municipal/ Authorised laboratory :		
19.12.1	80mm diameter	100 Meter	555.00
19.12.2	100mm diameter	100 Meter	727.00
19.12.3	125mm diameter	100 Meter	909.00
19.12.4	150mm diameter	100 Meter	1094.00
19.12.5	200mm diameter	100 Meter	1466.00
19.12.6	250mm diameter	100 Meter	1856.00
19.12.7	300mm diameter	100 Meter	2084.00
19.12.8	350mm diameter	100 Meter	2324.00
19.12.9	400mm diameter	100 Meter	2582.00
19.12.10	450mm diameter	100 Meter	2847.00
19.12.11	500mm diameter	100 Meter	3129.00
19.12.12	600mm diameter	100 Meter	3713.00
19.13	Extra for every operation of disinfecting the C.I./D.I. main by flushing with water containing bleaching powder at 0.5 gms per liter of water and cleaning the same with fresh water, including getting the samples of water tested in the Govt. / Municipal/ Authorised laboratory :		
19.13.1	80mm diameter	100 Meter	205.00
19.13.2	100mm diameter	100 Meter	248.00
19.13.3	125mm diameter	100 Meter	303.00
19.13.4	150mm diameter	100 Meter	354.00
19.13.5	200mm diameter	100 Meter	529.00
19.13.6	250mm diameter	100 Meter	618.00
19.13.7	300mm diameter	100 Meter	705.00
19.13.8	350mm diameter	100 Meter	833.00
19.13.9	400mm diameter	100 Meter	961.00
19.13.10	450mm diameter	100 Meter	1097.00
19.13.11	500mm diameter	100 Meter	1170.00
19.13.12	600mm diameter	100 Meter	1517.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.14	<p>Electromagnetic Bulk Flow Meters Supply of Electromagnetic full bore meter complete as per specification including transportation to site, storage, safety, installation, testing, commissioning, making connections with existing pipe line, including excavation at site, cuts in the existing pipe system, dewatering and reinstating the same after completion of installation as per specification and drawings including all taxes. Accuracy of meter + 0.3% of measured value, Flange connection as per AWWA & IS, Liner:</p> <p>Hard Rubber, Fully welded sensor housing complying to IP 68 standard, Electrodes SS 316, Sensor housing SS 304, Cable gland 1/2" NPT, Sensor housing fully welded SS 304 housing with protective Polyurethane paint, Flow Transmitter/ Converter : Microprocessor based, modular design display 2 line back lit LCD for indication of actual flow rate, forward, reverse, sumtotalizer, Perfection category : IP 65 Output : One current output (4-20 mA) one scalable pulse output</p>		
	Dia in mm		
19.14.1	50mm	Each	105378.00
19.14.2	65mm	Each	110517.00
19.14.3	80mm	Each	115354.00
19.14.4	100 mm	Each	124629.00
19.14.5	125 mm	Each	128197.00
19.14.6	150mm	Each	131765.00
19.14.7	200 mm	Each	140295.00
19.14.8	250 mm	Each	170692.00
19.14.9	300 mm	Each	198272.00
19.14.10	350 mm	Each	205408.00
19.14.11	400 mm	Each	231500.00
19.14.12	450 mm	Each	334013.00
19.14.13	500 mm	Each	414993.00
19.14.14	600 mm	Each	427155.00
19.14.15	700 mm	Each	546871.00
19.14.16	900 mm	Each	921768.00
19.14.17	1000 mm	Each	1017085.00
19.14.18	1200 mm	Each	1192440.00
19.14.19	1400 mm	Each	1493622.00
19.14.20	2000 mm	Each	1665293.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.14.21	Lightening Arrester Unit	Each	8733.00
19.14.22	MS Panel with Transmitter, Totalizer, etc as per specifications	Each	14291.00
19.14.23	Uninterruptible Power Supply [6hr Battery Backup (500 VA)]	Each	28581.00
19.15	Supply and Installation of Multi Jet, dry dial, inferential type, horizontal, Magnetically coupled , class B"water meters Conforming to IS- 779: 1994 and ISO 4064: 1993 standard with EEC/ MID certification mark , with IP 68 protection class copper can register with 5 mm tempered mineral glass cover, successful Life Cycle Test Certificate from FCRI and AMR compatibility with 5 years warranty complete with brass nuts and nipples:-		
	Dia in mm		
19.15.1	15 mm	No	1323.00
19.15.2	20 mm	No	2209.00
19.15.3	25 mm	No	3964.00
19.15.4	40 mm	No	7367.00
	Woltman Turbine Bulk Meters		
19.16	Supply and Installation of Woltman Type, dry dial, inferential type, Magnetically coupled, Class B"accuracy water meters in any position with interchangeable mechanism Conforming to ISO 4064: 1993 standard with EEC certification mark, with IP68 protection class copper can register with 5 mm tempered mineral glass cover, AMR compatibility with 5 years warranty complete and successful accuracy test certificate from FCRI, Palakkad with C.I. Body "T" Type structure:-		
	Dia in mm		
19.16.1	50 mm	Each	10909.00
19.16.2	65 mm	Each	11992.00
19.16.3	80 mm	Each	14238.00
19.16.4	100 mm	Each	18809.00
19.16.5	125 mm	Each	24292.00
19.16.6	150 mm	Each	30497.00
19.16.7	200 mm	Each	30853.00
19.16.8	250 mm	Each	93254.00
19.16.9	300 mm	Each	153300.00
19.16.10	400 mm	Each	273487.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.17	Dirt Box with S.S. Strainer as per specifications		
	Dia in mm		
19.17.1	50 mm	Each	3456.00
19.17.2	65 mm	Each	3826.00
19.17.3	80 mm	Each	4917.00
19.17.4	100 mm	Each	6732.00
19.17.5	125 mm	Each	11919.00
19.17.6	150 mm	Each	14107.00
19.17.7	200 mm	Each	21154.00
19.17.8	250 mm	Each	36800.00
19.17.9	300 mm	Each	52098.00
19.17.10	400 mm	Each	87130.00
19.18	Labour only for laying in position, Jointing & field testing of High Density Polyethylene pipes, (HDPE) of 6, 8 & 10 Kg/sq.cm confirming to IS 4984/ 14151/ 12786/ 13488 with necessary jointing material like mechanical connector or jointing pipes by heating to the ends of pipes with the help of Teflon coated electric mirror/ heater to the required temperature and then pressing the ends together against each other, to form a monolithic & leak proof joint by thermosetting process. It may be required to be done with Jacks/Hydraulic Jacks/ But fusion machine. (50mm & above fusion jointed & below 50mm mechanical jointed)		
	PE-100		
19.18.1	20 mm dia	meter	16.00
19.18.2	25 mm dia	meter	18.00
19.18.3	32 mm dia	meter	23.00
19.18.4	40 mm dia	meter	28.00
19.18.5	50 mm dia	meter	34.00
19.18.6	63 mm dia	meter	51.00
19.18.7	75 mm dia	meter	73.00
19.18.8	90 mm dia	meter	99.00
19.18.9	110 mm dia	meter	142.00
19.18.10	125 mm dia	meter	184.00
19.18.11	140 mm dia	meter	229.00
19.18.12	160 mm dia	meter	298.00
19.18.13	180 mm dia	meter	374.00
19.18.14	200 mm dia	meter	461.00
19.18.15	225 mm dia	meter	583.00
19.18.16	250 mm dia	meter	715.00
19.18.17	280 mm dia	meter	890.00
19.18.18	315 mm dia	meter	1125.00
19.18.19	355 mm dia	meter	1432.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.18.20	400 mm dia	meter	1848.00
19.18.21	450 mm dia	meter	2339.00
19.18.22	500 mm dia	meter	2898.00
19.18.23	560 mm dia	meter	3612.00
19.18.24	630 mm dia	meter	4576.00
19.18.25	710 mm dia	meter	4631.00
19.19	Labour for laying in position Blue MDPE (medium density polyethylene) pipes conforming to ISO 4427:1996 manufactured from virgin resin PE 80 Food grade compounded Raw Material having Blue Colour only with quality assurance certificate from quality agencies like CIPET (India) and other recognised agencies for usage in Drinking Water System. The cost shall include testing of all materials, Inspection charges, transportation upto site, transit insurance, loading, unloading, stacking etc. complete.		
19.19.1	PN 16 (SDR 9)		
19.19.1.1	20mm dia	meter	16.00
19.19.1.2	25mm dia	meter	21.00
19.19.1.3	32mm dia	meter	34.00
19.19.1.4	40mm dia	meter	44.00
19.19.1.5	50mm dia	meter	70.00
19.19.1.6	63mm dia	meter	102.00
19.19.1.7	75mm dia	meter	134.00
19.19.1.8	90mm dia	meter	195.00
19.19.1.9	110mm dia	meter	288.00
19.19.2	PN 12.5 (SDR 11)		
19.19.2.1	25mm dia	meter	21.00
19.19.2.2	32mm dia	meter	34.00
19.19.2.3	40mm dia	meter	42.00
19.19.2.4	50mm dia	meter	60.00
19.19.2.5	63mm dia	meter	82.00
19.19.2.6	75mm dia	meter	113.00
19.19.2.7	90mm dia	meter	162.00
19.19.2.8	110mm dia	meter	240.00
19.19.3	PN 10 (SDR 13.6)		
19.19.3.1	63mm dia	meter	70.00
19.19.3.2	75mm dia	meter	97.00
19.19.3.3	90mm dia	meter	142.00
19.19.3.4	110mm dia	meter	206.00

S. No.	Particulars of Items	Unit	Rates (in Rs.)
19.20	Labour for laying in position, jointing, testing and commissioning of ISI marked PVC-O (Oriented Plasticized Polyvinyl Chloride) of PN-16, PN-20 & PN-25 ring fit type pipe having orientation class 500 : C-1.4 with integral homogeneous spigot, elastomeric sealing ring made of EPDM rubber (one per pipe) including testing of joints, cost of jointing materials etc. Complete in all respect. Pressure Rating as per IS Code — IS:16647-2017 for following diameters.		
19.20.1	110 mm dia	meter	260.00
19.20.2	160 mm dia	meter	436.00
19.20.3	200 mm dia	meter	540.00
19.20.4	250 mm dia	meter	760.00
19.20.5	315 mm dia	meter	958.00
19.20.6	400 mm dia	meter	1461.00
19.21	Labour for laying in position, jointing, Testing of following P.V.C. - U pipes with solvent cement joint for Non-pressure gravity drain and sewer applications including testing of joints, cost of jointing materials etc. complete in all respect.		
19.21.1	110 mm dia.	Per Meter	41.00
19.21.2	125 mm dia	Per Meter	62.00
19.21.3	160 mm dia	Per Meter	88.00
19.21.4	200 mm dia	Per Meter	128.00
19.21.5	250 mm dia	Per Meter	138.00
19.22	Labour for Laying in position, Jointing, Testing of DWC (double wall corrugated) PE Pipes of renowned duly tested inclusive of all cost of inspection charges, transportation charges, transit insurance, loading/unloading and stacking at site/ store etc, complete.		
	Internal dia /Outer dia		
19.22.1	76 mm / 90 mm	Meter	41.00
19.22.2	100 mm / 120 mm	Meter	62.00
19.22.3	135 mm / 160 mm	Meter	88.00
19.22.4	150 mm/ 180 mm	Meter	128.00
19.22.5	170 mm / 200 mm	Meter	138.00
19.22.6	200 mm / 238 mm	Meter	216.00
19.22.7	250 mm / 295 mm	Meter	353.00
19.22.8	300 mm / 345 mm	Meter	504.00
19.22.9	400 mm / 480 mm	Meter	702.00
19.22.10	500 mm / 580 mm	Meter	1049.00
19.22.11	600 mm / 715 mm	Meter	1675.00
19.22.12	800 mm / 950 mm	Meter	2762.00
19.22.13	1000 mm / 1200 mm	Meter	4166.00

CHAPTER- 20

Construction of Tube Wells, Chlorination system & Trenchless work

- 1 Tube well construction shall be as per IS 2800:2019
- 2 Tube well testing shall be as per IS 2800:2019
- 3 Specification for Gravel for use as pack in tube wells shall be as per IS 4097 - 2019
(Reaffirmed 1999)
- 4 Methods of tube well development shall be as per IS 11189 - 2020
- 5 Unplasticized PVC screen and casing pipes for bore/tube well shall be as per IS 12818-2010(Reaffirmation year 2016)
- 6 Mild Steel tubes, tubular & other wrought steel fittings specification IS 1239 (Part-1)- 2004(Reaffirmation year 2019)/ IS 1239 (Part-2)- 2011.(Reaffirmation year 2016)
- 7 Deep well hand pumps, components and special tools shall be as per IS 15500 (Pt- 1 to 8):2004(Reaffirmation year 2020)
- 8 Specification for un-plasticized PVC pipes for potable water supply IS 4985-2000.(Reaffirmation year 2020)
- 9 A complete tube well shall mean :-
 - (a) A borehole vertical within the prescribed non-vertical limits drilled upto designed depth in alluviums or rocky areas.
 - (b) Installation of requisite well assembly i.e., housing pipe, blind pipe, slotted pipe or strainers, bail plug and other accessories.
 - (c) Placing of suitable gravel pack (in case of gravel, packed tube-wells). Placing of suitable sand pack (in case of sand packed tube-wells)
 - (d) Development of tube-well with object of :-
 - (i) Producing effect of natural gravel pack (in case of naturally packed design).
 - (ii) Producing maximum sand free yield of water for the specified standard draw down in alluvium and rocky areas.
 - (e) Conducting yield test by over pumping of the tube well.
 - (F) The tube well shall be disinfected after completion of the yield test.
- 9 Tube wells drilled shall be perfectly vertical. The rates for drilling are inclusive of the verticality test required to be conducted. All the relevant Indian Standards specifications of the B.I.S. shall also be applicable.

- 10 For locating the proper site for tube well construction within the selected habitation, if resistivity survey is required then the resistivity survey shall be carried out by a well qualified and experienced geohydrologist using his own suitable resistivity meter.
- 11 Yield test shall be done as per para 5.3 of IS - 2800 :2019
- 12 In all types of tube wells the casing pipe of specified diameter shall be lowered up to a minimum depth of 9 meters below ground level. If the collapsible strata in overburden continue beyond 9 meters depth then the casing pipe shall be lowered up to rock level and embedded in rock in a depth of 0.15 meter. The casing pipe shall also be extended above ground level in a height of about 0.3 meter.
- 13 The diameter of ordinary tube wells shall be 125 mm up to bottom level of the casing pipe and 115 mm in the rock below the casing. Such tube wells shall be designated as 125/115 mm dia ordinary tube wells.
- 14 The telescopic tube wells in the basaltic rock area where intertrappean formation (collapsible strata between the rocks) is present. The nominal diameter of the tube well upto the level of intertrappean formation shall be 150 mm. The intertrappean formation shall be encased by 125 mm dia G.I. casing pipe. Therefore, the finished nominal diameter of tube well in the intertrappean formation shall be 125 mm but in the rock below the intertrappean formation, the nominal diameter of tube well shall be 115 mm. Such tube wells shall be designated as 150/125/115 mm dia (telescopic) ordinary tube wells.
- 15 The nominal diameter of ordinary tube well constructed for installation of power pumps shall be 150 mm or 200 mm for the entire depth depending upon the type of size of pump to be installed in the tube well. Such tube wells shall be designated as 150 mm dia ordinary tube well & 200 mm dia ordinary tube wells.
- 16 The gravel packed tube wells shall be constructed in alluvial formations, suitable for such tube wells, in which the fine and uniform sand is present in the water bearing aquifer. The gravel packed tube wells should be constructed after obtaining necessary clearance from the competent authority.
- 17 Precautions should be taken to prevent damage to the tube well during the drilling. Precautions should also be taken to avoid any accident during drilling.
- 18 Precautions should be taken to prevent damage to the pipes and other assembly during lowering in to the well.

19 Development of tube well :-

19.1 The well shall be developed either by surging and agitating or by over pumping and back washing with an air lift and velocity jetting etc. Any other acceptable method may also be adopted. This development process shall be continued until the stabilization of sand and gravel pack has taken place.

19.2 The development of the tube well by over pumping should be done at 15 percent to 25 percent higher discharge than the expected discharge from the tube well. The final discharge should be free from sand with a maximum tolerance of 20 parts of sand in one million parts of water by volume after 20 minutes of starting the pump.

20 Testing of yield and draw down :

20.1 The drawing off of water through a tube well results in a lowering of water level. This drawdown creates a hydraulic gradient in the water bearing material with the result that under ground flow into the tube well takes place. The rate of inflow depends upon the hydraulic gradient, permeability and saturated thickness of water bearing material and of tube well construction.

20.2 After the well has been completely constructed and cleaned out and the depth of the well accurately measured, this test should be carried out.

20.3 This test is conducted by installing a test pump in the tube well temporarily and pumping out water. At each rate of discharge, pumping is carried out at least for 30 minutes. If the water level and discharge are found to fluctuating, development is carried out for some more hours, until the discharge becomes steady and sand content is within tolerable limits. The specific capacities of the well for various pumping rates are computed based on drawdown test data. Discharge may be measured by any method detailed in 13.7 of IS : 5120-1977(Reaffirmation year 2016) "Technical requirements for rot dynamic special purpose pumps (first revision).

20.4 Since the yield is influenced by a number of factors such as geological formation, rainfall. Neighboring tube wells, etc. the pumping rate shall, in general, not exceed 60 percent of the yield determined by test.

21 The water sample for chemical analysis shall be collected in 2 liters plastic bottle and samples for bacteriological analysis shall be collected in 300 ml sterilized bottle as per the direction of Engineer in charge. Only testing charges will be borne by the urban local body.

- 22 All care and precautions shall be taken and it shall be ensured that there shall be no accidents while drilling the borehole. Proper dress and equipments like gumboots, helmets etc. shall be provided by the contractor to the workmen at site.
- 23 If a tube well is found dry or with less yield and if it is not to be used for water supply due to any reason, the tube well shall be fitted with MS cap securely and a concrete block of 0.45m X 0.45m X 0.45m with M15 cement concrete would be constructed on it to prevent any accident or damage to the tube well and also to use the bore at any later stage for recharging or for any other purpose.
- 24 Measurement :-
Depth of the bore & length of the pipes shall be measured in Rmt. Cap shall be measured in number. Gravel shall be measured in cum after deducting the voids.
- 25 Rates :-
The rate shall include the cost of the material and labour involved in all the operation described in the items.

SPECIFICATIONS FOR ONLINE AUTOMATIC WATER CHLORINATION SYSTEM

Supply and Installation, of Non-electric, Online, Automatic Water Chlorination System, for piped water supply schemes, using solid chlorination agent, and should be safe and simple to handle. The technology should be empaneled or approved for drinking water. The chemical should be approved for drinking water and should be certified/listed/approved to NSF ANSI 60 (for drinking water) or equivalent. It should be completely soluble in water and shouldn't have any insoluble residues left after dissolving in water. The system should be suitable to operate without electricity.

Principle of Chlorination Plant Operation :

The Chlorination plant should be able to be installed online during water distribution, and capable to generate upto 2 ppm of chlorination in running water, and upto 1 ppm in case of hand pumps. The operation shall be online and automatic, and should be able to operate without continuous intervention.

Chlorination Plant should have following features and capabilities:

1. It should avoid leakage or seepage of solution.
2. Plant should be automatically driven, safe & easy to operate.
3. Should be compact and occupy less foot print
4. Plant should be able to work by water supply pressure upto 2 bar, in case of piped water supply schemes.
5. Plant should be able to operate without electricity
6. Plant should be suitable to be operated with pre-filled cartridges so that frequent refill of chemical at site shall not be required.
7. Plant should preferably have indication when chemical in the system is exhausted, and refill might be required.

(For Detail Refer to Specifications prepared by the Urban Administration and Development Department, IS Code & CPHEEO Manual)

CHAPTER 20 - Construction of Tube Wells, Chlorination system & Trenchless work

S.No.	Particulars of Items	Unit	Rate (In Rs.)
A	Resistivity Survey		
20.1	Carrying out the resistivity survey by VES method using Schlumberger configuration for locating the proper spot for drilling of tube well with in the selected habitation, including Photography, interpretation of resistivity data and submission of report in the desired format along with resistivity necessary graph, photographs and readings.	Per Successful point	1544.00
B	Construction of Ordinary Tube well		
20.2	Drilling of perfectly vertical bore hole of a diameter suitable to receive 125mm nominal diameter casing pipe upto desired depth below ground level inclusive of the labour charges for transporting, lowering and fixing of 125mm nominal diameter M.S./G.I./U.P.V.C. casing pipe inside the bore hole including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.		
20.2.1	in all types of collapsible strata consisting of soils, clays, sand, moorum, gravel, boulders etc.	Meter	503.00
20.2.2	in all types of rocks.	Meter	648.00
20.3	Drilling of perfectly vertical bore hole of 115 mm diameter up to desired depth below ground level in all types of rocks including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.	Meter	615.00

20.4	Drilling of perfectly vertical bore hole of a diameter suitable to receive 150mm nominal diameter casing pipe upto desired depth below ground level inclusive of the labour charges for transporting, lowering and fixing of 150mm nominal diameter M,S./G.I./U.P.V.C. casing pipe inside the bore hole including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.		
20.4.1	in all types of collapsible strata consisting of soils, clays, sand, moorum, gravel, boulders etc.	Meter	566.00
20.4.2	in all types of rocks.	Meter	716.00
20.5	Drilling of perfectly vertical bore hole of 150mm diameter upto desired depth below ground level in all types of rock including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete	Meter	744.00
20.6	Drilling of perfectly vertical bore hole of a diameter suitable to receive 200mm nominal diameter casing pipe upto desired depth below ground level inclusive of the labour charges for transporting, lowering and fixing of 200mm nominal diameter M,S./G.I./U.P.V.C. casing pipe inside the bore hole including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.		
20.6.1	in all types of collapsible strata consisting of soils, clays, sand, moorum, gravel, boulders etc.	Meter	587.00
20.6.2	in all types of rocks.	Meter	754.00
20.7	Drilling of perfectly vertical bore hole of 200mm diameter upto desired depth below ground level including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.		
20.7.1	In all types of collapsible strata (intertrappean formation) including charges for transportation, lowering and fixing of 150mm nominal diameter GI casing pipe, welded joints only.	Meter	636.00
20.7.2	in all types of rocks.	Meter	774.00

20.8	Drilling of perfectly vertical bore hole of 150mm diameter up to desired depth below ground level in all types of strata including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete. In intertrappean formations (collapsible strata between rocks) including charges for transportation and making all necessary arrangements etc. including lowering and fixing of 125mm nominal diameter (gig. or U.P.V.C.) Casing pipe.	Meter	717.00
20.9	Providing and fixing of well cap on top of the tube well for protection		
	M.S. Caps		
20.9.1	100mm dia	each	214.00
20.9.2	125mm dia	each	231.00
20.9.3	150mm dia	each	269.00
20.9.4	200mm dia	each	320.00
C	Construction of Gravel Packed Tube well		
20.10	Drilling of perfectly vertical bore hole of following diameters for construction of Gravel Packed tube well up to desired depth in alluvial formation consisting of Soils, Clays, Sand, Gravel, Moorum, Boulders etc. and retaining the bore hole by using suitable drilling mud or foam or temporary housing pipe including all works pertaining to drilling such as transportation, installation and removal of drilling machine etc. complete.		
20.10.1	300mm diameter	Meter	765.00
20.10.2	350mm diameter	Meter	816.00
20.10.3	400mm diameter	Meter	850.00

20.11	Labour charges for assembling, centering and lowering of properly designed casing pipe assembly inside the bore hole drilled for construction of Gravel Packed tube well including the cost of providing and fixing of centraliser, and transportation of casing assembly etc. complete.		
20.11.1	Casing assembly composed of 100mm diameter blank and slotted G.I. Casing pipes	Meter	55.00
20.11.2	Casing assembly composed of 150mm diameter blank and slotted G.I. Casing pipes	Meter	83.00
20.11.3	Casing assembly composed of 200mm diameter blank and slotted G.I. Casing pipes	Meter	102.00
20.11.4	Casing assembly composed of 100mm dia. UPVC blank and screened pipes.	Meter	39.00
20.11.5	Casing assembly composed of 150mm dia UPVC blank and screened pipes.	Meter	47.00
20.11.6	Casing assembly composed of 200mm dia UPVC blank and screened pipes.	Meter	61.00
20.12	Providing and fixing of M.S. bail plug as per I.S. 2800 (PART-I) 2001 in the bottom of casing assembly		
20.12.1	100mm dia	each	292.00
20.12.2	150mm dia	each	368.00
20.12.3	200mm dia	each	450.00
20.13	Providing gravel packing with uniformly graded gravel as per I.S. 4097 of 1999 (revised up to date) in the annular space between outer wall of casing pipe assembly and inner wall of bore hole including cost of gravel, transportation, stacking, washing and packing in layers of suitable thickness including all lead and lifts complete.	Cu.m	638.00
D	Installation of Hand Pumps		
20.14	Labour charges for installation of India Mark II Hand Pump with 30 meter long 32mm dia riser pipe assembly and all other accessories including transportation of Hand Pump from specified departmental stores to site.	each	686.00
20.14.1	Add to Item No.-1, above for fixing the extra length of riser pipe assembly beyond 30 meters	Meter	20.00

E	Development, yield test of Tube wells		
20.15	Labour charges for installation of submersible pumping sets at 50m or more depth temporarily in the tubewell for a maximum of eight hours for the purpose of conducting yield test for tube well. (Any one of the below depending on the approximate yield observed during drilling operations).		
20.15.1	Submersible pumping sets upto 2.2 kW.	Each	1568.00
20.15.2	Submersible pumping set upto 2.2 kW to 7.5 kW.	Each	1720.00
20.15.3	Submersible pumping set above 7.5 kW	Each	1797.00
20.16	Conducting the yield test of tube well by operating the pumping set continuously for a desired time period and measuring the discharge and drawdown of tube well at a suitable time interval as per the direction of Engineer in Charge including cost of energy, cost of installation of suitable measuring device and hire charges of pumping set etc. complete.		
20.16.1	Submersible pumping sets upto 2.2 kW.	Per Hour	436.00
20.16.2	Submersible pumping set upto 2.2 kW to 7.5 kW.	Per Hour	466.00
20.16.3	Submersible pumping set above 7.5 kW	Per Hour	551.00
20.17	Labour charges for taking out the submersible pumping set from tube well after completion of yield test or development of tube well.		
20.17.1	Submersible pumping sets upto 2.2 kW.	Each	1367.00
20.17.2	Submersible pumping set upto 2.2 kW to 7.5 kW.	Each	1489.00
20.17.3	Submersible pumping set above 7.5 kW	Each	806.00
20.18	Development of gravel packed tube well by Air compressor of suitable capacity including hire charges for all the required tools and plants etc. complete, for maximum duration of eight hours.	Per Hour	612.00
20.19	Measurement of yield of tube well by operating hand pump continuously for four hours manually.	Each	400.00

F	Supply of ISI mark Hand Pumps : G.I. Riser, G.I. Casing & UPVC Casing Pipes		
20.20	ISI mark India mark-II deep well hand pump complete with 10 Nos. MS connecting rods, (12mm x 3M long) Normal stand assembly.	Each	7884.00
20.21	ISI mark India mark -II deep well hand pump complete with 10 Nos. MS connecting rods, (12mm x 3M long) telescopic stand assembly.	Each	7947.00
20.22	ISI mark India Mark-II extra deep well hand pump complete with 20 Nos. MS connecting rods (12mm x 3M)2 counter weight electro galvanized & passivated normal stand assembly.	Each	11494.00
20.23	ISI mark India mark-II extra deep well hand pump complete with 20 Nos. MS connecting rods (12mm x 3m)2 counter weight electro galvanized & passivated telescopic stand assembly.	Each	11752.00
20.24	ISI Mark 32mm dia G.I. riser pipe in 3 meter length socketed on one end as per I.S. 1239 (Part-I) 1990 up-to-date amendments and socket as per I.S. 2062/1990 up-to-date amendment.	Meter	225.00
20.25	Supply of I.S.I. marked G.I. casing pipe (Plain) medium class in 4 to 7 meters length one end fitted with socket as per I.S. 1239 (Part-1 & Part-2) 1992 with IVth revision (Up-to-date amendments)		
20.25.1	100mm dia	Meter	958.00
20.25.2	125mm dia	Meter	1284.00
20.25.3	150mm dia	Meter	1525.00
20.26	I.S.I. marked UPVC casing pipe confirming to IS 4985/1988 (with up-to-date amendments)		
20.26.1	Screen pipes with ribs 100mm dia	Meter	404.00
20.26.2	Screen pipes with ribs 125mm dia	Meter	625.00
20.26.3	Screen pipes with ribs 150mm dia	Meter	831.00
20.26.4	Screen pipes with ribs 200mm dia	Meter	1468.00
20.26.5	CM casing pipes 100mm dia	Meter	285.00
20.26.6	CM casing pipes 125mm dia	Meter	453.00
20.26.7	CM casing pipes 150mm dia	Meter	553.00
20.26.8	CM casing pipes 200mm dia	Meter	1168.00
20.26.9	CS casing pipes 150mm dia	Meter	488.00
20.26.10	CS casing pipes 200mm dia	Meter	930.00

G	Disinfection of tube wells		
20.27	Disinfection of tube well by using bleaching powder solution as per direction of Engineer-in-Charge including cost of all material & labour.	Each tube well	42.00
20.28	Construction of platforms in different strata and as per site conditions.		
20.28.1	Construction of 76 cm x 76 cm x 40 cm foundation block in M-15 cement concrete for fixing the pedestal of Hand Pump including excavation, cost of material and labour etc. complete	Each	1210.00
20.28.2	Construction of cement concrete platform as per design around the hand pump in M-15 cement concrete including excavation, centering, shuttering, cost of all the materials and labour and curing etc. complete.	Each	3894.00
20.28.3	Construction of cement concrete platform as per design around the hand pump in M-15 cement concrete including excavation, centering, shuttering, cost of all the materials and labour and curing etc. complete. Including filling in 30 cm depth after removing Black cotton soil including ramming, watering etc. complete in areas of Black cotton soils.	Each	4296.00
20.28.4	Construction of cement concrete drain as per design in M-15 cement concrete including excavation, centering, shuttering, cost of all the materials and labour and curing etc. complete.	Meter	430.00
20.28.5	Construction of cement concrete drain as per design in M-15 cement concrete including excavation, centering, shuttering, cost of all the materials and labour and curing etc. complete. Including filling in 30 cm depth after removing Black cotton soil including ramming, watering etc. complete in areas of Black cotton soils.	Meter	526.00
20.29	Construction of concrete block over dry tube wells for protection of size 0.45m x 0.45m x 0.45m in M-15 cement concrete mix.	Each	464.00

	Online Automatic water chlorination		
20.30	Supply of Non Electric, Online automatic Water Chlorination unit to be fitted online in piped water supply schemes for village communities with water consumption upto 50,000 liters per day, capable of providing upto 2 ppm chlorination. The Chlorination unit to preferably use solid chlorination agent. The Chlorination agent shall be certified to and approved for drinking water as per ANSI Standard 60 or equivalent (Documentary evidence shall be required at the time of submission of the tender). The Water Chlorination technology shall be empaneled or approved for drinking water. (Documentary evidence shall be required at the time of submission of the tender). The chemical should be completely soluble in water and shouldn't have any insoluble residues left after dissolving in water.	Each	38200.00
20.31	Supply of water chlorination cartridges for water chlorination units mentioned in item no. 18.30, having capacity of minimum 20,00,000 liters, at 1 ppm chlorination	Each	4520.00
20.32	Installation of online, non-electric, automatic Water Chlorination for hand pumps, rate includes for Installation Charges per one plant including Pipes, fittings, Specials Joints, Tools & Tackles etc. as per site condition.	Lot	9760.00

20.33	Supply of non-electric, online automatic Water Chlorination unit to be fitted on a hand pump (IM MK II/III) capable of providing upto 2 ppm chlorination. The Chlorination unit to preferably use solid chlorination agent. The Chlorination agent shall be certified to and approved for drinking water as per ANSI Standard 60 or equivalent (Documentary evidence shall be required at the time of submission of the tender). The Water Chlorination technology shall be empaneled or approved for drinking water. (Documentary evidence shall be required at the time of submission of the tender). The chemical should be completely soluble in water and shouldn't have any insoluble residues left after dissolving in water.	Each	9280.00
20.34	Supply of water chlorination cartridges for water chlorination units mentioned in item 18.33 above, having of capacity of around 100,000 liters, at 1 ppm chlorination	Each	560.00
20.35	Installation of online automatic Water Chlorination for hand pumps mentioned in item 18.33 above, Installation Charges per one plant including Pipes, fittings, Specials Joints, Tools & Tackles etc. as per site condition.	Lot	1600.00
20.36	Installation of HDPE/ DWC PE/ PVC-O pipe by Horizontal Direction Drilling Method including preparing and setting up the plant and equipment, making string of new pipe material, installing new pipe string and making the system ready for commissioning by HDD operation including drilling, stringing, reaming and pulling back the new pipe on the designed bore path alignment, proper disposal of drilling fluid, as per code of practice for horizontal direction drilling technique suiting indian conditions. Required pipes/ specials and other civil work shall be paid separately-in all types of soils and depth upto 1.00m.		
20.36.1	HDPE pipe of any class-90 mm outer dia	RM	451.00
20.36.2	HDPE pipe of any class-110 mm outer dia	RM	492.00

20.37	Horizontal directional drilling (by trenchless technology) upto 100 mm dia (outer to outer) HDPE/ DWC PE / PVC-O pipe below natural ground level including carrying out survey work at the job site for determining underground cable trenches like telephone, cable, water & sanitary lines and resistivity test for finding the soil strata using necessary equipments for completion of works, mobilizing of machineries and specialized crew at the job site complete in all respect excluding cost of entry & exit pits and Supply, laying & jointing of all types of pipes		
20.37.1	In all type of soil , Moorum		
20.37.1.1	Upto depth of 1.5m	Meter	3485.00
20.37.1.2	More than 1.5m and upto 3.00m	Meter	3833.00
20.37.1.3	More than 3.0m and upto 4.50m	Meter	4646.00
20.37.1.4	More than 4.5m and upto 6.00m	Meter	5808.00
20.37.2	In rock		
20.37.2.1	Upto depth of 1.5m	Meter	6388.00
20.37.2.2	More than 1.5m and upto 3.00m	Meter	6969.00
20.37.2.3	More than 3.0m and upto 4.50m	Meter	7550.00
20.37.2.4	More than 4.5m and upto 6.00m	Meter	8131.00
20.38	Horizontal directional drilling (by trenchless technology) more than 100mm and upto 150 mm (outer to outer) dia HDPE/ DWC PE/ PVC-O pipe below natural ground level including carrying out survey work at the job site for determining underground cable trenches like telephone, cable, water & sanitary lines and resistivity test for finding the soil strata using necessary equipments for completion of works, mobilizing of machineries and specialized crew at the job site complete in all respect excluding cost of entry & exit pits and Supply, laying and jointing of all types of pipes		
20.38.1	In all type of soil , Moorum		
20.38.1.1	Upto depth of 1.5m	Meter	4414.00
20.38.1.2	More than 1.5m and upto 3.00m	Meter	4878.00
20.38.1.3	More than 3.0m and upto 4.50m	Meter	6388.00
20.38.1.4	More than 4.5m and upto 6.00m	Meter	6969.00
20.38.2	In rock		
20.38.2.1	Upto depth of 1.5m	Meter	7550.00
20.38.2.2	More than 1.5m and upto 3.00m	Meter	8711.00
20.38.2.3	More than 3.0m and upto 4.50m	Meter	9873.00
20.38.2.4	More than 4.5m and upto 6.00m	Meter	11034.00

20.39	Horizontal directional drilling (by trenchless technology) of more than 150 mm and upto 200mm dia (outer to outer) HDPE/ DWC PE/ PVC-O pipe below natural ground level including carrying out survey work at the job site for determining underground cable trenches like telephone, cable, water & sanitary lines and resistivity test for finding the soil strata using necessary equipments for completion of works, mobilizing of machineries and specialized crew at the job site complete in all respect excluding cost of entry and exit pits and Supply, laying and jointing of all types of pipes		
20.39.1	In all type of soil , Moorum		
20.39.1.1	Upto depth of 1.5m	Meter	4878.00
20.39.1.2	More than 1.5m and upto 3.00m	Meter	5808.00
20.39.1.3	More than 3.0m and upto 4.50m	Meter	6969.00
20.39.1.4	More than 4.5m and upto 6.00m	Meter	7550.00
20.39.2	In rock		
20.39.2.1	Upto depth of 1.5m	Meter	8131.00
20.39.2.2	More than 1.5m and upto 3.00m	Meter	9292.00
20.39.2.3	More than 3.0m and upto 4.50m	Meter	10454.00
20.39.2.4	More than 4.5m and upto 6.00m	Meter	11615.00
20.40	Horizontal directional drilling (by trenchless technology) of more than 200 mm and upto 250mm dia (outer to outer) HDPE/ DWC PE/ PVC-O pipe below natural ground level including carrying out survey work at the job site for determining underground cable trenches like telephone, cable, water & sanitary lines and resistivity test for finding the soil strata using necessary equipments for completion of works, mobilizing of machineries and specialized crew at the job site complete in all respect excluding cost of entry and exit pits and Supply, laying and jointing of all types of pipes		
20.40.1	In all type of soil , Moorum		
20.40.1.1	Upto depth of 1.5m	Meter	5808.00
20.40.1.2	More than 1.5m and upto 3.00m	Meter	6969.00
20.40.1.3	More than 3.0m and upto 4.50m	Meter	8131.00
20.40.1.4	More than 4.5m and upto 6.00m	Meter	9292.00
20.40.2	In rock		
20.40.2.1	Upto depth of 1.5m	Meter	8711.00
20.40.2.2	More than 1.5m and upto 3.00m	Meter	9873.00
20.40.2.3	More than 3.0m and upto 4.50m	Meter	11034.00
20.40.2.4	More than 4.5m and upto 6.00m	Meter	12196.00

20.41	Horizontal directional drilling (by trenchless technology) of more than 250 mm and upto 300mm dia (outer to outer) HDPE/ DWC PE / PVC-O pipe below natural ground level including carrying out survey work at the job site for determining underground cable trenches like telephone, cable, water & sanitary lines and resistivity test for finding the soil strata using necessary equipments for completion of works, mobilizing of machineries and specialized crew at the job site complete in all respect excluding cost of entry and exit pits and Supply, laying and jointing of all types of pipes.		
20.41.1	In all type of soil , Moorum		
20.41.1.1	Upto depth of 1.5m	Meter	6969.00
20.41.1.2	More than 1.5m and upto 3.00m	Meter	8711.00
20.41.1.3	More than 3.0m and upto 4.50m	Meter	9873.00
20.41.1.4	More than 4.5m and upto 6.00m	Meter	10454.00
20.41.2	In rock		
20.41.2.1	Upto depth of 1.5m	Meter	10454.00
20.41.2.2	More than 1.5m and upto 3.00m	Meter	12196.00
20.41.2.3	More than 3.0m and upto 4.50m	Meter	13938.00
20.41.2.4	More than 4.5m and upto 6.00m	Meter	15680.00
20.42	Excavation for driven and exit pit as per site requirement for pushing/ pulling of HDPE/DWC / PVC-O pipe in trenchless technology, with proper protection at sides with shoring sheets/ wooden planks and ISMB's, maintaining, back filling, necessary dewatering.		
	In all type of soil , Moorum		
20.42.1	Upto depth of 1.5m	Per Pit	15000.00
20.42.2	More than 1.5m and upto 3.00m	Per Pit	17500.00
20.42.3	More than 3.0m and upto 4.50m	Per Pit	20000.00
20.42.4	More than 4.5m and upto 6.00m	Per Pit	25000.00

20.43	Excavation for driven and exit pit as per site requirement for pushing/ pulling of HDPE/DWC / PVC-O pipe in trenchless technology, with proper protection at sides with shoring sheets/ wooden planks and ISMB's, maintaining, back filling, necessary dewatering.		
	In rock		
20.43.1	Upto depth of 1.5m	Per Pit	45000.00
20.43.2	More than 1.5m and upto 3.00m	Per Pit	52500.00
20.43.3	More than 3.0m and upto 4.50m	Per Pit	60000.00
20.43.4	More than 4.5m and upto 6.00m	Per Pit	75000.00
20.44	Trenchless Pipe pushing method of suitable dia. hole below natural ground level and pushing MS casing pipe and insertion of carrier pipe and anti corrosive treatment, epoxy painting, PU coating and insulation sheet / spacer including excavation, shoring/ strutting, preparation and maintaining the entry and exit pit, excluding cost of Supply, laying and jointing of MS casing Pipe and carrier Pipe (For Railway and Highway crossings, Nallah crossings)		
20.44.1	In all type of soil , Moorum		
20.44.1.1	300mm to 600mm	Meter	12480.00
20.44.1.2	More than 600mm and upto 1000mm	Meter	14860.00
20.44.1.3	More than 1000mm	Meter	18920.00
20.44.2	In rock		
20.44.2.1	300mm to 600mm	Meter	35690.00
20.44.2.2	More than 600mm and upto 1000mm	Meter	41480.00
20.44.2.3	More than 1000mm	Meter	46560.00

RESISTIVITY SURVEY REPORT

Name of local bodyDistrict

Ward Number Mohalla/Basti.....

Name of Contractor Registration no. of ma

Work Order No..... Date

Date of Survey

Name of Geohydrologist

Model No. & Make of Resistivity meter used for sounding

Maps (Not to scale) Showing the location of survey point (To be attached separately in A-4 size sheet).

DATA SHEET OF FIELD MEASUREMENTS

S.No.	AB/2 Meters	MN/2 Meters	Spacing Factor K K = 3.14 (AM/AN)/MN	Measured resistance (OHMS)	Resistivity OHM-M

STRATA - CHART

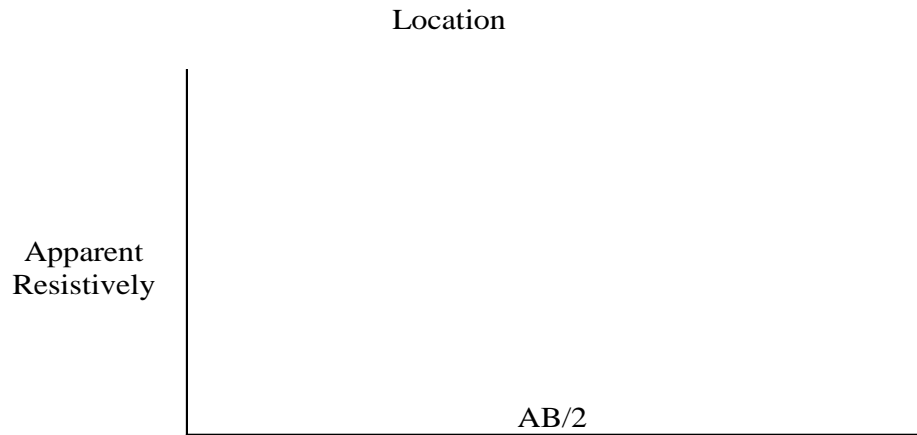
Name of local bobyDistrict
 Ward Number Mohalla/Basti
 Name of Contractor Registration No. of
 Work Order No. Date
 Date of Starting of Tube well construction
 Date of completion of tube well construction
 Name of Sub-Engineer in charge of work
 Measurement Book Number
 Exact location of drilling

G	L	Details
Depth	Strata	
		1. Type of tube well
		2. Diameter of tube well
		3. Total depth of tube well
		4. Details of casing pipe Type (G.I./UPVC/BLANK/SLOTTED) Diameter mm Length meter
		5. Static water level in the tube well
		6. Type of pump installed
		7. Length of riser pipe installed Type (G.I./UPVC)
		8. Yield of tube well
		9. Draw down at above yield

Signature of Contractor

Signature of
Sub Engineer
Office

Signature of
Assistant Engineer
Office



Interpretation Report

Possible Strata expected at the spot

S.No.	Possible Strata Form	Depth below Ground Level		Remark
		to		

Recommendation :-

Signature of Geohydrologist

ANNEXURE -3

Name of local bodyDistrict

Ward Number Mohalla/Basti.....

Name of Contractor Registration no. of machine

Work Order No..... Date

Date of yield test

Diameter of tube well Depth of tube well

Result of the Test

S.No.	Type of tube well	Dia of bore	Dia. of casing	Drift in mm at 30m depth (all in one direction) to be filled by concerned engineer	Permissible limit of vertically in 30m depth (all in one direction)
1.	Shallow	up to 30 cm	15 cm		15 mm
2.	Shallow & deep	37.2 cm or 40 cm	20 cm		30 mm
3.	Deep	45 cm or more	25 cm or more		50 mm

Signature of Contractor

Signature of Sub-Engineer

Signature of Assistant Engineer

YIELD TEST OF TUBE WELLS

Name of local bodyDistrict

Ward Number Mohalla/Basti.....

Name of Contractor Registration no. of machine

Work Order No..... Date

Date of yield test

Diameter of tube well Depth of tube well

Static water level in tube well

Type and K.W. of pumping set used for yield test

Type of measuring device used for measurement of discharge

Depth at which the pumping set installed

Time at which the yield test started

Data Sheet of field measurement

S.No.	Time	Water level in the tube well measured from top of casing pipe	Discharge of tube well
1			
2			
3			

Signature of Contractor

Signature of Sub-Engineer

Signature of Assistant Engineer

CHAPTER - 21 INTAKE WELL

Notes : (In this chapter items are only for estimating purpose, shall not be considered for the direct payment of the work to the contractor).

- 1 Scope
- 1.1 The Specification covers the requirements for Survey, structural design & Construction of Intake Well.

- 2 An intake is a structure constructed in a surface water / near surface water to obtain water from the source. The intake structures are built to draw water from rivers, streams, lakes, and reservoirs etc.

- 3 Selection for Intake Site : While taking a decision regarding the location of the intake site, the following points should be kept in view:
 - 3.1 The inflow point of the intake drawing water from a stream or a lake should be well below the water surface to prevent hydraulically wasteful air entrainment but sufficiently high enough from the bed to avoid entrapping of suspended solids.
 - 3.2 The location should provide the most suitable quality of water available.
 - 3.3 The site should have firm strata for good foundations.
 - 3.4 The site should avoid the existence of currents that may endanger the safety of the structure or deposit silt against or on it.
 - 3.5 The effect of floods at the proposed point should be studied and all precautions taken for the safety of the structure as well as safe working of the intake during floods.
 - 3.6 The distance from where the power is available should be considered.
 - 3.7 The distance of pumping station from the proposed site of intake also deserves consideration.
 - 3.8 In case of impounding reservoir, the intake should be located at the deepest point in reservoir, which is generally near the dam site, in order to take the optimum utility of the reservoir capacity.
 - 3.9 Excavation, PCC, RCC, steel & other works shall be paid as per items in the respective chapters of Sewage Water Supply ISSR.
 - 3.10 The payment for the dewatering shall be made only one time.

- 4 **Surveys needed for intake well :** Following surveys shall have to be conducted for preparation of detailed drawings & designing of intake well.
 - 4.1 River gauging
 - 4.2 Geological and soil investigation
 - 4.3 Cross sectional survey
 - 4.4 Contour survey of the area.

- 4.5 Hydrological survey of the source.
- 4.6 Catchment area survey (the catchment area of the source should be located on the map).
- 4.7 Fixing of HFL etc.
- 4.8 Sanitary survey.
 - 4.8.1 Sanitary surveys at regular, intervals at field management levels and inspections at supervisory management level should be conducted. The catchment area of the source should be located on the maps. Potential sources of pollution observed in the catchment should be marked. The type of pollution e.g. industrial/domestic waste discharges, wastes of animal origin and agricultural run-offs should be determined.
 - 4.8.2 The reports of such survey should be promptly sent to the Pollution Control Authorities as well as water works authorities to promote corrective action. Procedure for monitoring of preventive action taken should be laid down and observed. An instant action plan for providing chlorination of raw-water should be available and brought into effect

- 4.9 Measurement of flow.
 - 4.9.1 In cases of sources such as springs, rivers, canals, etc., there should be a permanent arrangement for recording daily flows near the intake works. Appropriate records in the form of graphs showing variation of flows in the source for each month in a year and for each year shall be maintained. Rain gauge stations should be established to record daily rainfall in the reservoir catchment and appropriate rainfall records should be built up and compared with discharges/ storages available. In case of reservoirs, the regime tables for filling and emptying of storages should be maintained for each year.

- 5.0 **Measurement:**
 - 5.1 All the measurement shall be recorded under the relevant item of the
 - 5.2 Generally the work of survey, design & construction of intake well is awarded on turnkey basis and payment is made on lumpsum basis as per payment schedule given in the tender.

- 6 **Rates**

The rate shall include the cost of materials and labour involved in all the operations except for the items measured/ enumerated separately under clause 'Measurements', which shall be paid for separately.

CHAPTER - 21 INTAKE WELL

S.No.	Particulars of Items	Unit	Rate (in
21.1	Providing, constructing coffer dam in river basin/dam storages as per type design including excavation, filling the middle portion with B.C. soil (in gunny bags if required). Providing impervious/semipervious materials on both side of B.C. soil (in gunny bags if required) including ramming, compacting to the satisfaction of Engineer-in-Charge, till the completion of work including dismantling coffer dam after completion of works and disposing off the material as directed by the Engineer-in-charge.	Cum	719.00
Note	Pay line maximum - Top width payable shall be 2 mtr. and maximum payable side slopes shall be 1.5 horizontal to 1 vertical, if the constructed top width of the side slopes are less, then the measurement at actual are payable. Extra top width or flatter slopes are not payable. Contractor is free to use ballies, plastic sheets, piles, pipes, CGI sheets for supporting hearting materials instead of impervious/semiimpervious hearting materials for which no extra payments shall be payable. 30% payment shall be withheld for dismantling of coffer dam. This foot note shall appear in tender condition.		
21.2	Excavation in general in soft material comprising of soft soil, soft moorum,sand, hard moorum with boulders in wet or dry condition for head works and allied works by well sinking process for average depth of 12 m and lead of 150m including shoring, barricading, guarding , refilling, disposing of surplus excavated stuff as directed by Engineer-in-charge , etc. complete		
a	Diameter upto and including 3M	cum	842.00
b	Diameter more than 3M	cum	751.00

S.No.	Particulars of Items	Unit	Rate (in
21.3	Providing and fabricating at work shop, carting to site of work, including transport, loading, unloading, hoisting, lowering and setting out at actual site of sinking well, M.S. plate cutting edge for R.C.C. well curb consisting of 350 mm M.S. plate, 10 mm thick, champhering at bottom. Cutting edge should be provided in pieces not less than 2 m in length. Each joint should be plain from outside and jointed by gusset plate 400 x 200 x 12 mm thick M.S. plate with 12 nos. of 20 mm dia. crurshank headed bolts (gusset plates from inside) with unequal angle of 90 x 60 x 10 mm should be welded from top of chamfered portion at 14 mm from bottom so that 15 mm side should be in contact with cutting edge with overlap of 300 mm joints. 16 mm dia bar should be welded to M.S. plate 200 mm below the top surface and length should be 1.8 m above plate with a bend 300 mm from plate surface including 3 coats of anticorrosive paint as directed by Engineer-in-Charge.	Kg.	91.00
21.4	Providing and filling puddle (selected good impervious clay) in weirs in proper layers of 15 cm including watering, ramming and compaction etc. complete with all leads and lifts.	Cum	320.00
21.5	Providing and filling around the Intake well, boulders filling of selected variety and size of boulders including cost of all materials, labour, transportation etc. complete with all leads and lifts.	Cum	930.00
21.6	Providing and fixing 80 mm dia A.C./P.V.C. pipe weep holes at 1.5 m c/c staggered in abutment of the approach bridge/ramp including cost of all materials and labour involved with all leads and lifts etc. complete with all leads and lifts.	RM	202.00
21.7	Providing and fixing M.S. chequerred plate flooring of following thickness supported on M.S. angles (25 x25 x 5 mm size) including welding, cutting and fabricating the plate to the required square or round shape, making holes in the plate, including providing and applying 3 coats of anticorrosive paint etc. complete as directed by Engineer-in-charge.		
21.7.1	6 mm thick	Sqm	3887.00
21.7.2	8 mm thick	Sqm	4924.00
21.8	Providing at site of works ISI standard RCC slotted pipes for collection of water into Intake well with R.C.C. collar of NP-3 class including cost of all central and local taxes, octroi, inspection, transportation etc. complete.		
21.8.1	450 mm dia	RM	4129.00
21.8.2	600 mm dia	RM	6413.00

S.No.	Particulars of Items	Unit	Rate (in
21.9	Labour for lowering, laying and jointing RCC slotted pipes of following diameters including all leads and lifts, cost of jointing material, complete as directed by Engineer-in-charge.		
21.9.1	450 mm dia	RM	234.00
21.9.2	600 mm dia	RM	311.00
21.10	Labour for lowering, laying and jointing CI 'B' class / MS (cement mortor lined inside & epoxy coated on out side) pipe connecting mains with rubber gaskets including transportation of pipes from stores to site of works, cost of jointing materials, cost of rubber gasket with all leads and lifts etc. complete.		
	CI Class "B"		
21.10.1	300 mm dia	RM	292.00
21.10.2	350 mm dia	RM	349.00
21.10.3	400 mm dia	RM	440.00
21.10.4	450 mm dia	RM	460.00
21.10.5	500 mm dia	RM	530.00
21.10.6	600 mm dia	RM	736.00
21.10.7	700 mm dia	RM	978.00
21.10.8	750 mm dia	RM	1106.00
21.11	Providing, lowering, laying and placing in position, shrouding (covering) material for porous pipe gallery/slotted pipe gallery/trench gallery with all leads and lifts involved including transportation of materials to site of works, screening and washing of materials and placing in position with given section, etc. complete as directed by Engineer-in-charge.		
21.11.1	40 mm gauge pebbles	Cum	1646.00
21.11.2	12 mm to 20 mm gauge pebbles	Cum	1984.00
21.11.3	6 mm to 12 mm gauge pebbles	Cum	2262.00
21.11.4	Coarse sand (from river sand at site)	Cum	1044.00
21.11.5	Fine sand (from river sand at site)	Cum	1100.00
21.12	Providing and fixing in position C.I./ M.S. steps or 22 mm dia M.S. bar step with proper anchorage etc. and providing and applying 3 coats of anti-corrosive paint etc. complete as directed by Engineer-in-charge.	Each	499.00
21.13	Providing and fixing M.S. sluice gates PN 1.0 in position as per detailed drawing and specification including cost of all materials, labour, operating pedestal, connecting rod, painting with three coats of anti-corrosive paint etc. complete as directed by Engineer-in-charge.	Kg.	112.00

S.No.	Particulars of Items	Unit	Rate (in
21.14	Providing and fixing in position C.I./M.S. rose pieces in intake wells including cost of all materials and labour, painting with three coats of anti-corrosive oil paint, etc. complete as directed by Engineer-in-charge.	Kg.	94.00
21.15	Providing and spreading around the well 1 mm thick polyethylene sheet complete as directed by Engineer-in-charge.	Sqm	28.00
21.16	Dewatering charges for estimation purpose for head works in river basin or dam :		
21.16.1	Approach channel	RM	10000.00
21.16.2	Intake well of 3 m dia.	Each	95000.00
21.16.3	Inspection well of 2 m dia.	Each	60000.00
21.16.4	Connecting main	RM	6000.00
21.16.5	Intake well of 6 m dia.	Each	300000.00
21.16.6	Approach Bridge	RM	2000.00
Note	i) The contractor at his request may be allowed to start construction of masonry steining so as not to allow silting of well in on coming monsoon and while paying masonry 25% amount shall be withheld and released only when excavation to the full depth is completed.		
	ii) Dewatering : Total dewatering charges are to be proposed in the tender as lump sum amount and 75% is payable for excavation and 25% is payable for construction of well/gallery. Out of 75% excavation, break-up shall be as under		
	25% for last 1 m depth		
	20% for 2 m depth which just above last 1 m depth		
	15% for 2 m depth which just above last 3 m depth		
	15% for the rest of depth from water table level.		
	iii) The provisions made for dewatering in the tender being on lump sum basis, the same shall have to be reduced/increased proportionately as the length of approach channel, connecting main or approach bridge reduces/increase during actual execution.		
	Condition No. (i) and (ii) shall appear in tender document.		

S.No.	Particulars of Items	Unit	Rate (in
21.17	Carrying out recuperation/yield test for asserting the discharge of constructed well/excavated profile as directed by Engineer-in-charge. The test carried out by drawing down water from the well/profile below normal/subsoil water level up to full depth rise is water level is recorded. The normal water level/subsoil water level in the well/profile as well as strainer/suction level at pump as per design of W.S. scheme shall be recorded prior to the test including cost of all materials. overhead, labouers etc. completed as directed. (The test shall be carried out for 7 days.)		
21.17.1	Lps more than 25,000	Day	2850.00
21.17.2	Lps less than 25,000	Day	2052.00
21.18	Detailed physical survey, sanitary survey, Hydrological survey, Geological investigation including trial bores for soil investigation / test for preparation of river cross section, fixing of HFL, structural design & estimation for intake wall, approach bridge, coffer dam etc. complete as directed by the Engineer-in-charge in / near, river / stream / dam / lake / spring / canal etc. collection of data regarding design of complete item of intake well from relevant department etc. all level will be with reference to mean sea level including following work:-	Job	5% of estimated cost.
(i)	Preparation of Contour plan general arrangement drawing, layout of site, cross-section of site on proper scale as directed by the department.		
(ii)	Architecural/ Structural drawing having following items :-		
(a)	Layout plan. Elevation, cross-section i/c detailes of cofferdam, approach bridge, intakewell, and different small element relevant to complete item of intakewell.		
(b)	Preparation of estimate on preveling schedule of rates, architecural drawing / structural drawing for technical clearance from proper competent sanctioning authority state government or it may be central government department. Complete set of drawing and estimate will be submitted in 6 sets.		

Chapter No. 22

WATER TREATMENT PLANT, SEWAGE TREATMENT PLANT & CHLORINATION SYSTEM

Notes : (In this chapter items are only for estimating purpose, shall not be considered for the direct payment of the work to the contractor).

1 WATER TREATMENT PLANT

1 Designing (structurally, hydraulically & aesthetically), providing and constructing and commissioning **Conventional Water Treatment Plant** consisting of Civil Works, including cost of providing and applying Epoxy paint to inside surface of water retaining structures in contact with Chlorine and providing anti-termite treatment to entire structure below ground level, Mechanical and Electrical components of various sub-works as given below : including necessary hydraulic testing, structural testing, equipment testing and trial run for 3 months, etc. complete as directed by Engineer-in-charge . (turn-key job).

1) Aeration Fountain : Plan area not less than 0.625 square metre per MLD

2) Parshal Flume : With necessary devices, consisting of simple mechanical indicator (Pedestal type guage)

3) Flash Mixer Rapid mixing device, detention time 60 seconds to give velocity gradient 300 to 400 sec⁻¹ vane mixer type Conforming to IS 7090 of 1985

4) Flocculator : Conforming to I.S. 7208 of 1974 (Type-C) with detention period of 30 minutes

5) Clarifier : Vertical flow / Horizontal flow circular tank, weir loading with mechanical sludge scraper conforming to I.S. 10313/1982, detention period, overflow rate for average design flow for different types of sedimentation tanks shall be as follows.

Tank type	Surface loading m ³ /m ² /d*		Detention period, hr*		Particles normally removed
	Range	Typical value for design	Range	Typical value for design	
Plain Sedimentation	Up to 6000	15-30	0.01-15	3-4	Sand, silt and clay
Horizontal flow, Circular	25-75	30-40	2-8	2-2.5	Alum and iron floc
Vertical Flow (Upflow) Clarifiers	-	40-50	-	1-1.5	Flocculent

* at average design flow

5.1 Wire length relative to surface area determines the strength of the outlet current. Normal wire loadings are upto 300 m³/d/m. But when settling tanks are properly designed, well clarified waters can be obtained at weir loadings of even upto 1500 m³/d/m.

6) Rapid Sand Filters and Filter House Filter designed for filtration rate of 4,800 litres per square metre per hour, minimum 2 beds for plant up to 10MLD for larger plants as specified , filters house with roof slab, pipe gallery and plat form minimum 5.5 metre in width

a) Filter Sand : Effective size 0.45 to 0.70mm, uniformity coefficient not more than 1.7, nor less than 1.3 , depth of water over sand 0.75M , free board 50 cm , gravel 0.45 M depth, sand and gravel Conforming to I.S. 849 (I)-77 back wash by air wash, Standard appurtenances (to be specified), rate of flow controller, filler gauge, sand expansion gauge etc.

b) Wash Water Tank : Capacity to be specified and suitable to supply water to wash 2 filter units at a time where the units are 4 or more.

c) Wash Water Pumps : Capacity to fill water tank in 1 hours with 100% standby

d) Air Blowers : Capable of delivering 600 LMP per square metre of free air, of filter area at 0.4 Kg/square cm at the under drains (100% stand by)

7) Chemical House in Two Storeys

a) Ground floor to accommodate 7 days alum requirement and sundry storage.

b) First floor to accommodate alum and lime tanks etc.

c) Solution tanks : Minimum 3 tanks (One for preparation, Second for dosing and third as standby), each tank capable of giving 8 hours maximum dose without interruption, minimum free board 0.30M trays for dissolving, level indicator tor mechanical agitation devices, solution feed and drain lines, solution feed device(Constant head device strength of solution upto 10% only) Conforming to I.S.9222 part-I/1979.

8) Clear water Sump and Pump House

a) Capacity of sump : One hour of designed flow.

b) Pump House : Pump house of required size over the sump or by the side

9) Store House : Suitable for alum storage of three months requirement in monsoon with 10% extra capacity for other sundry articles.

10) Vacuum feed type chlorinators .

a) Conforming to I.S. 10553 (Part-2) 1983 Reaffirmed 2001

b) Chlorine Requirement

- 1 Rate of withdrawal of chlorine from container depends upon the size of container and the surrounding temperature. For guidance, Table given below may be followed.

Temperature °C	Chlorine discharge per day in Kg.		Tonne
	45 kg Cylinders	67 kg Cylinders	
4	2.72	4.08	45
10	6.35	9.50	110
15	10.75	16.10	130
20	14.50	21.54	254
27 & above	18.70	28.12	315

When the gas discharge rate from a single container does not meet the requirements, two or more containers can be connected to a manifold and discharge simultaneously. It is advisable not to couple more than four containers to a manifold.

c) Chlorinator equipment and container room, Handling, Storage & Safety shall Conform to I.S. 10553 Part-I 1983 Reaffirmed 2007

d) 100% standby shall be provided

11) By pass arrangement - C.I. Or M.S. pipes with inside and out side epoxy coating.

12) Drainage arrangement : RCC pipes up to plot boundary.

13) Electrical installation : Both internal and external including entire plant area.

14) Laboratory equipment : As per requirement (to be specified during tendering)

15) Sanitary blocks : Carpet area-15 square metre minimum up to 25 Mld. And 25 square metre above 25 Mld. (min 2 units well separated for Ladies & Gents).

16) Administrative block :

To accommodate office room, chlorine room, laboratory room, panel board room, blower room etc. (appropriate sizes should be provided at time of estimation)

17) Rates given below are inclusive of uplift pressure if any and dewatering during entire work.

18) All RCC water retaining structure shall be constructed in M-30.

NOTE: Condition from Sr. No.1 to 19 shall form a part and parcel of the tender and must be incorporated in draft tender papers of conventional treatment plants.

2 Designing (structurally & aesthetically), providing and constructing high rate **Unconventional Water Treatment Plant** i.e. Simplified Water Treatment Plants consisting of Civil Works, including cost of providing and applying Epoxy paint to inside surface of water retaining structures in contact with Chlorine and providing anti-termite treatment to entire structure below ground level, Mechanical and Electrical components of various sub-works as given below : including necessary hydraulic testing, structural testing and trial run for 3 months, etc. complete as directed by Engineer-in-charge .

- 1) Aeration fountain
- 2) Inlet arrangements
- 3) Mixing channel with venturi flume and flow measuring arrangement.
- 4) Inlet channel
- 5) Flocculator- Conforming to I.S. 7208-1974 (Type-C) with detention period of 30 minutes.
- 6) Tube Settlers - " Designing, fabricating and construct Tube Settlers with square or any other shaped tube like Circular, Chevron, Hexagonal diamond shaped, triangular, rectangular etc. having proven performance." A widely used material for their construction is thin plastic sheet (1.5 mm) black in colour, though plastic and asbestos cement pipes have also been used.
- 7) Rapid sand gravity filters.
- 8) Filter house
- 9) Chemical house
- 10) Alum tanks 2 Nos. with mixing, carrying and dosing arrangement with piping.
- 11) Gravity feed gas chlorinator with 100% standby.
- 12) TCL solution tank with mixing, carrying and dosing arrangement with piping.
- 13) Bye-pass arrangement
- 14) External and internal electrification
- 15) Laboratory equipments
- 16) Wash water tanks of capacity equal to 2% of designed quantity of filtered water in a day (+) 10%
- 17) Wash water pumps with 100% standby
- 18) Pure water sump capacity equal to 1 hour pumping capacity
- 19) Pure water pump house over the sump / by the side of sump
- 20) Drainage arrangements
- 21) Alum store
- 22) Sanitary block with necessary water supply and drainage arrangement.
- 23) Rates given below are inclusive of uplift pressure if any and dewatering during the entire work
- 24) All RCC structures shall be constructed in M-30.

25) Unconventional Treatment Plants less than 1 MLD capacity shall not be constructed

Note:- Conditions from Sr.No. 1 to 26 shall form a part and parcel of the tender and must be included in draft tender documents for the work of unconventional treatment plants.

- 3 Designing (structurally & aesthetically), providing, fabricating, **Package Water Treatment Plant**. At the shop, transporting to site, installing, testing and commissioning at the site, giving necessary one month's free test and trial run with guarantee for one year, etc. complete.

Prefabricated Package Water Treatment Plant comprising following

1. Rapid mixing Channel in M.s.Sheets and M.S. baffle.
2. Flocculator not less than 10 minutes detention, in M.S. prefabricated box, flocculation being achieved either by glass pebbles of graded size or PVC tetra pod or equivalent arrangement to ensure good flock formation.
3. Plate or tube settlers of not less than 30 minutes detention, in M.S. prefabricated box, plates/ tubes mounted in the settler basin with inclination of not less than 60 degree to horizontal
4. Rapid sand gravity filter in M.S. prefabricated box with filter sand not less than 500mm thick, supported on false floor below with polypropylene nozzles spaced at not more than 500mm centres in either direction.
- 5.Backwashing, inlet facilities shall be provided.
 - 5.1 Air Blowers : Capacity of delivering 600 LMP per sq.mtr. Of free air of filter area 0.4 Kg./Cm^2 at under drain (100% stand by)
 - 5.2 Wash water tank of capacity equal to 2 % of designed quantity of filtered water in a day (+) 10%.
 - 5.3 Wash water pumps with 100% stand bye (Minimum 3Hp with all accessories)
- 6 Laboratory equipments
 - 6.1 External & internal Electrification.
 - 6.2 TCL solution tank with mixing , carrying & dosing arrangement with piping.
 - 6.3 Gravity feed gas chlorinator with 100 % standby.
 - 6.4 Alum storage unit.
 - 6.5 Drainage arrangement.
 - 6.6 Office and Lab. Space with necessary water supply & drainage arrangement and internal roads.
 - 6.7 Sump well and pump house
 - 6.8 Wire fencing with gate for W.T.P. Premises.
7. All civil works for foundation, consisting of raised RCC platform above G.L. or walls in B.B. Masonry or UCR masonry shall be provided as per needs at site.

8. Bye pass in the form of pipes or M.S. channels included in the design, effecting bye pass or such new tank and filter individually or both (Limit up to 5.0 M from W.T.P. face).

9. The entire M.S. Fabricated tank provided with FRP lining (5 mm thick) to inside face in contact with water epoxy painting-two coats with one coat of primer on outside. The thickness of plates employed shall be not less than 6mm.

10. Alum dosing and mixing arrangement to be provided in twin tanks, each of 8 hours capacity, capable of importing dose of 20 ppm with 5% solution. The alum tanks provided with a dose in steps 5 ppm and entire unit mounted on the top of flocculator/ settler box, in the form of prefabricated structure., with access platform and ladder. Alum boxes with FRP lining (5mm thick) inside and epoxy paint two coats with one coat of primer on outside.

11. Both flocculator and settling basins provided with hopper bottom with slope not less than 45 degrees to the horizontal Drain pipes and valves provided to both flocculator and settling basin.

12. Flow rating to Conform following parameters:

a) Velocities in channels not to exceed 0.6 M/Second.

b) Velocities in filter outlet pipes and valves not to excess 1 M/Seconds

c) Velocities interconnecting pipe and control not to exceed 1 M/ Seconds.

d) Backwash with air : Not required

e) Backwash with water : Not less than 0.6 Cu.M/ Sq.m. of filter bed area in filter box.

13. Free board for all units not less than 300mm

2

SEWAGE TREATMENT PLANT

- 1 Designing (structurally , hydraulically & aesthetically), providing, and constructing and giving satisfactory trials of modernised Sewage Treatment Plant consisting of receiving chamber, screen chamber, grit chamber, measuring flume, distribution chamber with primary and secondary treatment, etc. as detailed below, administration block of suitable size including allied units for waste disposal with all civil and mechanical works involved, etc. complete turn key job.

- 2 Designing (structurally , hydraulically & aesthetically), providing, and constructing, hydraulic testing, commissioning and giving satisfactory trials of modernised Sewage Treatment Plant consisting of inlet chamber, screen chamber ,Detritus Tanks, Partial flume, primary settling tanks, Aeration tanks, Secondary tanks, Sludge sump and pump house, Sludge thickener, Primary digester, SST sump and pump house, chlorine contact tank Chlorinators, Chlorinator room, sump cum blending tank (SCBT) PST sludge sump cum blending tank, Pump House Sludge Centrifuge gas holder, necessary piping work with required valves , gates, drains, pathways, Administrative Building cum Laboratory, Laboratory equipments, tools and plants, Spare parts etc. complete as turn-key job with all involved civil electrical and mechanical works inclusive of following items units as per detailed specification for civil, electrical and mechanical components with all duties and taxes etc complete.

- 3 Inlet Chamber:
Designing, providing and constructing RCC (M:30) Inlet chamber designed for the peak flow 2 DWF including necessary excavation in all types strata including walkway around the periphery. Each compartment will have phosper bronze, steel gate with extension rod, head stock, operating wheel, G.I. pipe railing etc. The work includes providing and making necessary arrangements to connect the flow to screen chamber by approach channel as directed and as per specifications.

- 4 Screen Chambers:
Designing, Providing and constructing and testing commissioning screen chamber, designed for average 1 DWF and maximum 2 DWF in RCC (M-30), including inlet pipe/ Channel from inlet chamber outlet pipe/Channel to detritus tank, free board of 0.50 M minimum RCC walkway 1.2 M wide with G.I. pipe railing. RCC stair case of 1.2m width from G.L. to screen chamber.

- 5 Detritus Tank:
 Designing , Providing and constructing continuously grit removal type of Detritus Tank, mechanically operated in RCC (M-30) capable of removing 100% 0.20mm size particle and above, having specific gravity 2.30 designed for one peak 2 DWF with suitable arrangement of separation of grit from putrescible solids including providing and making necessary arrangement of JB-1 inlet and outlet channels of required sizes as may be required to connect the flow to parshall flume etc. complete. including hydraulic testing for water tightness of the structure having minimum free board of 0.30m washout arrangement to grit chamber and platform 1.20m wide RCC walkway with G.I. pipe hand railing shall be provided. A pit for collecting grit conveyed by conveyor shall be provided. It should be suitable to handle the grit for carting. All arrangements shall be as per detailed specifications and as directed by the Engineer-in-Charge.
- Parshall
- 6 Designing, Providing and constructing Parshall, Flume Channel in RCC (M-30) for measuring quantity of sewage received at the treatment works, max flow of 2 DWF and minimum flow of 1/2 DWF including providing and making necessary arrangement of approach channel as may be required to connect the flow having minimum velocity of 0.3 m per second to Distribution Box (DB-1) The unit shall be provided with walkway & RCC staircase having width of 1.20m each etc. complete, including hydraulic testing for water tightness of the civil structure having free board of 0.6 m including electrically operated, flow indicating and flow integrating devices having standby of float operated ROF meter. All arrangement as per specifications.
- 7 Primary Settling Tanks With Equipments:
 Designing, Providing, constructing and hydraulic testing in RCC (M-30) water tight Primary Settling Tanks of 1 DWF capacity with feed chamber sludge and effluent chamber, base adequately supported providing 1.20 m wide clear peripheral and approach walkway inter connecting C.I. double flanged pipes from feed chamber of the clarifier distribution well grouting wherever necessary, including foundation etc. as per specification water depth at outer side shall be minimum 3.0 meter weir loading shall not be greater than 125cum DMF for average flow Bottom slope shall be 1:12
- 8 The floor of clarifier shall have 40mm thick (min) screed course of cement grout of mix C.M.1:2 Detention period shall be 2.25 hrs. dispersion box and stiffened weir plate made of mild steel plate not less than 8mm thick, anticorrosive epoxy paint on both faces shall be provided Minimum free board of 0.50 m be provided it includes inlet pipe from distribution chamber, central shaft inlet baffle outlet chamber Scum remover, skimming devices scum chamber, connecting channel from PST outlet chamber, to db-2 as per detailed specifications.

- 9 Aeration Tank (AT)
Designing, Providing and constructing in RCC mix (M-30) Aeration Tank in compartments to handle combined flow of 1 DWF incoming flow and recirculation flow including construction of inlet, outlet and distribution chamber DB-3 and providing 1.20 M wide clear peripheral and approach walkways, expansion joints wherever necessary, including foundation etc. as per specification. Peak factor shall be 2, F/M ration shall be 0.40 low speed aerator speed between 20 to 100 RPM recirculation flow @ 50% and free board 0.60m, Depth (SWD) 3.50m ,minimum D.O. level at A.T. 2 Mg/Lit MLVSS concentration shall be 2500mg/Lit and MLVSS concentration shall be 2000 Mg/Lit, HRT shall be 4 to 6 hours and STR 6-8 days. It should have compartments for washing oxygen transfer capacity of mechanical aerator shall not be less than 1.5 Kg/KWH, BOD of effluent 20mg/lit with input to aerator 0.15, to 0.30 Kwh/ 1000 cum of Aeration tank. All related works shall be as per detailed specification.
- 10 Secondary Settling Tanks with equipments
Designing, Providing and constructing in RCC (M-30) water tight Secondary settling tank having detention period 2 hours and SWD shall be 4.20 meter. The effluent BOD and SS from the secondary clarifier shall not be more then 20 Mg/lit and 30mg/lit. respectively. It should be hydraulically tested, bottom floor slope of 1:12 and free board of 0.60m minimum Dispersion box shall be made of Mild Steel plate not less then 8mm thick with anticorrosive epoxy paint from both faces and well stiffened. The sewage admitted at the centre flowing upward and outwards towards periphery be slowly and continuously collected towards a convenient discharge point near centre by a rotating wheel arm.
- 11 The Clarifier will be complete. with end drive half rotating bridge structural steel rake, over flow weir, walkway diffuser, over load alarms, having push bottoms, starters for the clarifier, walkway and the suitable sludge withdrawing arrangement with flush valve capable of withdrawing moisture content not more than 97% to 98% sloping floor shall have 40mm thickness (Minimum), screed course of cement grout of mix 1 cement :2 sand, rotating sludge scrapper mechanism filled with squeezes including providing and making necessary arrangements to connect the flow to outlet chamber (DB-4) then the gravity main for final disposal and as per detailed specification and obligatory provision. All other arrangements shall be as per detailed specification.
- 12 Sludge Thickener with equipments:
Designing providing and constructing water tight of Sludge Thickener (Gravity type) including foundation in RCC (M-30) with inlet and outlet chamber, influent well, inlet and outlet pipes, with sludge pit and sludge removal arrangement, grouting wherever necessary with walkway all around of 1.20m width, G.I. pipe railing interconnecting CI pipes all complete as per specification Detention time 24 hours. SWD shall be 4.25 metre with necessary fixed bridge scraper arrangement as per detailed specification and necessary inlet and outlet arrangement. All other arrangement as per detailed specification.

13 Primary Digester with mixer equipment(Fixed Cover)

Designing, Providing and constructing unit of water tight and gas tight Primary Digester suitable for 1 DWF plant and complete with pipe gallery, building staircase for access from dome of digester into inside staircase, walkways at springing levels etc. walls and base slab being in RCC M-30 domes in structural concrete including providing burners and civil works for gas collection, grouting wherever necessary etc. complete as per specification. It should be designed from min 9° C and max. 45° C and minimum detention time of 30 days, water depth shall not be more than 8.5 m free board shall be 0.6m with inlet and outlet arrangement of C.I. flanged pipes including giving hydraulic testing and air tightness testing. The item includes works for collecting Gas and Gas burner as per specification.

14 Secondary Digester with equipment(Fixed cover)

Designing ,Providing and constructing including foundation unit of water tight and gas tight Secondary Digester to deal with 1 DWF complete with pipe gallery, building, staircase for access from dome of digester into inside, staircase to walkways at springing levels etc. Walls and base slab and domes being in RCC M-30, providing arrangement for digested sludge from digesters to centrifuge, providing burners and civil works for gas collection grouting wherever necessary etc.complete. as per specification and obligatory provision All other arrangements as per detailed specifications.

15 S.S.T.Sump and Pump House with recirculation Pumps and Sludge Pumps to Digester:

Designing, Providing and constructing sump & Pump house of requisite capacity with ceiling height not less than 6 M Sludge stream for recirculation to aeration tank and excess sludge to SCBT including C.I. Piping to carry this flow to sump as per detailed specification and as directed by Engineer-in-charge.

16 Chlorine Contact Tank:

Designing, Providing and Constructing Chlorine Contact chamber of adequate capacity to deal with 1 DWF. Average flow. The chlorine contact tank should be of 30 minutes capacity during average flow to achieve 99.99% coli form reduction. Chlorine dose shall be maintained as per standard provision including provisions including designing, providing and constructing water supply arrangement for chlorination, including providing dewatering and bypass arrangements jointing to final effluent main and outlet weir etc. complete The effluent quality should match with the standard laid down by the department, as per the obligatory provision, detailed specification and as directed by Engineer-in charge.

- 17 Chlorinator and chlorinator Room/ Tonner Room
Designing, Providing and constructing chlorinators vaccume type 2 Nos. each having capacity of 10 Kg/Hr. as per obligatory provision and detailed specification with necessary provision of chlorinator room having floor area not less than 30 Sq.m including automatic residual chlorine controller with actuator and residual chlorine analyser including cost of chlorine cylinder, piping valves measuring and controlling equipments, safety devices, lifting equipments, etc. complete. as per I.S.-10553 (Part/II) 1982 The tonner room should have 3 MT capacity crane for loading and unloading facility. Tonner storage should distinctly isolated and should be for minimum 10 Tonners space and arrangement as per gas laws 1981 and factory act shall be provided, and all other matching amenities be provided, 5 MT gantry shall be provided for full length of Tonner room at 6 m height from floor level, with/ outlet chamber and treated effluent outlet channel etc. complete. as per detailed specification.
- 18 Sump Cum Blending Tank (SCBT)
Designing providing and constructing sump cum blending tank of appropriate size and detention time with free board of 0.60 m The slope of floor 1:4 with suction pit at the centre as per detailed specification and obligatory requirements
- 19 P.S.T. Sump cum Blending Tank, Pump House with recirculation pumps
Designing, providing and constructing pump house of appropriate size with pumps ,ceiling height minimum 6m over the circular sump for discharging the sludge to thickener and recycling of flow for blending, with C.I. Piping etc. complete. As per detailed specification
- 20 Sludge Centrifuge Room with Centrifuges:-
Designing, providing and constructing and installing including foundation etc. Sludge Centrifuge to handle the sludge flow of one day in one hour per unit with sludge dewatering unit drain etc. complete as per specification. Sludge centrifuge with all necessary arrangement as per detailed specifications and obligatory provisions, to be provided with satisfactory functioning.
- 21 Gas Holder:
Designing, Providing and constructing gas holder having gas collection system gas flow meter and gas burner with floating dome arrangement and storage time 6 hrs. to be constructed in M-30 having appropriate diameter as per detailed specification and obligatory provisions. The flattig dome shall be of 8mm thick M.S. plate minimum and shall be provided with two coats of anticorrosive epoxy coating from both faces.

- 22 Outfall Sewer :
 Designing providing and constructing appropriate Outfall Sewer of RCC NP-2 pipe to discharge treated effluent, untreated effluent from outlet chamber (after secondary clarifier) to the local nalla at a point shown on the drawing including necessary chambers for inspection/ cleaning including necessary excavation dewatering refilling, concrete encasing/ bedding ,concrete steps to reach the nalla bed level. pitching and energy dissipation chamber in the nalla portion etc. complete up to 50 m length RCC NP-2 pipe line and including all above items
- 23 Piping work in C.I. class -LA including Sluice valves, Reflux valves M.S.Gate.
 Providing laying and jointing pipe other than those already included in the above items for interconnection by-pass drains etc. of all units including adequate numbers of manhole chambers. The item includes excavation, refilling and hydraulic testing of pipes, valves, gates, accessories and cost of jointing material . The item includes required channels with gates for interconnection of units by pass drains etc. for all units and as directed etc. complete. as per detailed specification.
- 24 Administrative Building Cum Laboratory (G+ 1)
 Designing, providing and constructing Administrative Building office cum Laboratory including stores. This shall be a building having appropriate Carpet area at ground floor and at first floor complete as per specifications including necessary excavation , foundation in RCC M-20 framed structure, B.B. Masonry (II-Class in C.M. 1:6) 20mm cement plaster in C.M. 1:3, inside and outside painting, Aluminium door and window with glass panels mosaic tile flooring and skirting and all other allied items, fixtures fastening electrification arrangement water supply arrangement etc. complete. The building will have laboratory on upper floor of administrative building and should be so centralised that it should not be attached with any units but should have complete control of every unit as per Laboratory Equipment, beautification, telephone and intercom arrangement and wireless system etc. complete.
- B) Primary and secondary treatment - with digesters , sludge drying beds etc. complete.
- B) Primary and secondary treatment - with digesters , sludge drying beds etc. complete.

A Sewage Treatment Plant (STP) - Sequential Batch Reactor

Designing , providing, constructing, hydraulic testing, commissioning and giving satisfactorily trials consisting of Wet well including pumping up to inlet chamber, Inlet Chamber, Screen Chamber, Detritus Tanks, Distribution Chamber and Biological SBR Basins, Sludge Sump, Chlorine Contact Tank, Chlorinator Room/Shed, Sludge Centrifuge, Pump House, necessary piping work with required valves, gates, drains, pathways, Administration Block cum Laboratory, Laboratory Equipments, Tools and Plants, Spare Parts, etc. complete as turnkey job with all involved civil, electrical and mechanical works inclusive of following items, units as per detailed specifications for civil, electrical and mechanical components with all duties and taxes etc. complete. to achieve BOD < 10ppm, COD < 50ppm, TSS < 10ppm, to get recyclable quality of water for industrial / agricultural purposes.

B DEWATS (Decentralised Wastewater Treatment system) :-

Treated Water after full Treatment can be Reuse for external purpose such as Irrigation/Gardening etc. Treated water can be reuse for Toilet Flushing also but only after Installation of Mechanical Unit such as Sand & Carbon Filter unit next to DEWATS Modules.

Treated Water can be disposed of into Natural Water Bodies (If Reuse is not required) as per the pollution Control board Norms. In this case Treatment upto Secondary will be sufficient so the cost & Area will be reduce by app. 40%.

C Cement in Sewage structure

The surfaces of structures in contact with sewage such as Structures of STP shall be constructed with sulphate resistant cement.

CHAPTER 22 - WATER TREATMENT PLANT, SEWAGE TREATMENT PLANT & CHLORINATION SYSTEM

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
22.1	Water Treatment Plants - Conventional		
22.1.1	Cost of 1 MLD Treatment Plant	Job	68.00
22.1.2	Cost above 1 MLD and upto 2 MLD Treatment Plant	Per MLD	52.00
22.1.3	Add per MLD above 2 MLD and Upto 5 MLD	Per MLD	37.00
22.1.4	Add per MLD above 5 MLD upto 10 MLD	Per MLD	24.00
22.1.5	Add per MLD above 10 MLD upto 20 MLD	Per MLD	19.00
22.1.6	Add per MLD above 20 MLD upto 50 MLD	Per MLD	16.00
22.1.7	Add per MLD above 50 MLD upto 100 MLD	Per MLD	13.00
22.1.8	Add per MLD above 100 MLD	Per MLD	7.00
22.2	Water Treatment Plants - Unconventional		
22.2.1	Fixed cost for 1MLD	Job	53.00
22.2.2	Cost above 1 MLD and upto 2 MLD Treatment Plant	Job	88.00
22.2.3	Add per MLD above 2MLD upto 5 MLD	Per MLD	24.00
22.2.4	Add per MLD above 5 MLD upto 10 MLD	Per MLD	21.00
22.2.5	Add per MLD above 10MLD	Per MLD	18.00
22.3	Designing (aesthetically), providing, fabricating, Package water Treatment plant, At the Shop, Transporting to site, installing, testing and commissioning at the site, giving necessary one month's free test and trial run with guarantee for one year, etc., complete.		
	Prefabricated Package Water Treatment Plant comprising following,		
	1. Rapid mixing Channel in M.S. Sheets and M.S. baffle.		
	2. Flocculator not less than 10 minutes detention, in M.S prefabricated box, flocculation being achieved either by glass pebbles of graded size or PVC tetra pod or equivalent arrangement to ensure good floc formation.		
	3. Plate or tube settlers of not less than 30 minutes detention, in M.S. prefabricated box, plates/tubes mounted in the settler basin with inclination of not less than 60 degree to horizontal.		
	4. Rapid sand gravity filter in M.S. prefabricated box with filter sand not less than 500mm thick, supported on false floor below with polypropylene nozzles spaced at not more than 500 mm centers in either direction.		
	5. Backwashing, inlet facilities and outlet facilities shall be provided.		
	5. 1 Air Blowers : Capacity of delivering 600 LMP per Sq.Mtr. Of free air of filter area 0.4 kg/CM ² at under drain (100% stand by for capacity above 1 MLD)		
	5.2 Wash water tank of capacity equal to 2% of designed quantity of filtered water in a day (+) 10%		
	5.3 Wash water pumps with 100% stand by (Minimum 3HP with all accessories)		
	5.4 Back wash with water - not less than 0.6 m ³ /m ² of filter bed area in filter box.		
	5.5 Piping from outlet to sump.		
	6 Laboratory equipments		
	7. External & internal Electrification.		
	8. TCL Solution tank with mixing, Carrying & dosing arrangement with piping.		
	9. Gravity feed gas chlorinator with 100% standby.		
	10. Alum Storage unit.		
	11 Drainage arrangement.		
	12. Providing room with RCC roof for Office and Lab, Space with necessary water supply & drainage arrangement and internal roads.		

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
	13. Sump well and pump house		
	14. Internal road		
	15. Wire fencing with gate for WTP Premises.		
	16. All Civil works for foundation, consisting of raised RCC platform above GL or walls in B.B. Masonry or UCR Masonry shall be provided as		
	17. Bye Pass in the form of pipes or M.S. Channels included in the design, effecting bye pass of such new tank and filter individually or both (Limit upto 5.0 m from WTP face)		
	18. The entire M.S. Fabricated tank provided with FRP lining (5mm thick) to inside face in contract with water epoxy painting- two coats with one coat of primer on outside. The thickness of plates employed shall be not less than 6mm		
	19. Alum dosing and mixing arrangement to be provided in twin tanks, each of 8 hours capacity, capable of importing dose of 20 ppm with 5% solution. The alum tanks provided with a dose in steps of 5 ppm and entire unit mounted on the top of flocculator/settler box, in the form of prefabricated structure, with access platform and ladder. Alum boxes with FRP lining (5mm thick) inside and epoxy paint two coats with one coat of primer on outside.		
	20. Both flocculator and settling basins provided with hopper bottom with slope not less than 45 degrees to the horizontal drain pipes and valves provided to both flocculator and setting basin.		
	21. Flow rating to confirm following parameters :-		
	a) Velocities in channels not to exceed 0.6 M/ Second.		
	b) Velocities in filter outlet pipes and valves not to excess 1 M /seconds.		
	c) Velocities interconnecting pipes and control not to exceed 1 M /seconds.		
	d) Backwash with air : Not required		
	e) Backwash with water : Not less than 0.6 CuM/Sq.Mtr. of filter bed area in filter box.		
	22. Free board for all units not less than 300mm		
	23. Rates as above include all taxes, octroi and duties which would be specific to the site location.		
	24. All valves required shall be glandless instead of traditional valve.		
	25. All railings required shall be stainless steel pipe railing instead of G.I. Pipe railing.		
	26. External painting shall be in acrylic emulsion with silicon additives paints instead of waterproof cement paint.		
	Package Water Treatment Plant		
22.3.1	21 Cu.m/Hr. (0.5MLD)	each	67.00
22.3.2	34 Cu.m/Hr. (0.80MLD)	each	79.00
22.3.3	42 Cu.m/Hr. (1.00MLD)	each	85.00
22.3.4	63 Cu.m/Hr. (1.50MLD)	each	104.00
22.3.5	83 Cu.m/Hr. (2.00MLD)	each	149.00
22.3.6	125 Cu.m/Hr. (3.00MLD)	each	184.00

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
22.4	Sewage Treatment Plant		
22.4.1	a) Primary treatment - with extended sludge drying beds		
22.4.1.1	Rate upto 10 MLD	per mld	54.00
22.4.1.2	Add per MLD above 10 MLD upto 20 MLD	per mld	47.00
22.4.1.3	Add for capacity above 20 MLD upto 50 MLD	per mld	41.00
22.4.1.4	Add for capacity above 50 MLD upto 100 MLD	per mld	34.00
22.4.2	b) Primary & Secondary Treatment - with digesters, sludge drying beds		
22.4.2.1	Rate upto 10 MLD	per mld	65.00
22.4.2.2	Add per MLD above 10 MLD upto 20 MLD	per mld	57.00
22.4.2.3	Add for capacity above 20 MLD upto 50 MLD	per mld	50.00
22.4.2.4	Add for capacity above 50 MLD upto 100 MLD	per mld	41.00
Technological specification of DEWATS (Decentralised wastewater Treatment system) with cost & area requirement			
22.5	Construction of Non-Conventional (without any Electro- Mechanical Equipment in the Treatment System) Sewerage Treatment plant (STP)- Dewats (Decentralised wastewater Treatment)		
	Construction of Non-Conventional STP (Dewats- Decentralised Wastewater Treatment System) in RCC with Anaerobic & Anaerobic process for Various capacity of waste water flow (cum/day) as per situation/Actual site condition, as directed by Department/Engineer in Charge including the Different units:-		
	a) Primary Treatment - Settler -RCC Tank with one Baffled wall.		
	b) Secondary Treatment - Anaerobic Baffled Reactor with Anaerobic Filters. (ABR+AF) - RCC tanks with number of Baffled walls (App. 4-6 nos). It may vary as per actual design.		
	Anaerobic Baffled Reactor & Anaerobic Filter unit will be inclusive of providing & laying of 110 mm dia ISI mark PVC pipes vertically fixed on walls with necessary fittings (TEE, BEND, Elbow etc) with pressure of 6kg/cm ² of average length/height of 2 mtr & 4-6 nos on each baffled wall including perforated slabs in Anaerobic Filter.		
	c) Tertiary Treatment - planted gravel filter (PGF) with one partition wall.		
	d) Collection Tank - Average depth of tank would be 2 to 2.2 mtr at the outlet for settler, ABR+AF & collection Tank. And around 1 mtr for PGF.		
	Filter material in Anaerobic Filter = 70-80 mm size cinders.		
	Planted Gravel filter (PGF) - Boulders/ Rubble -80-120 mm size Metal/Pebbles -20-25 mm size, Metal/Pebbles -16-20 mm size,		
	Plants in PGF - Cana Indica- 4 nos/Sq.mt.		
	Capacity of Dewats (m3/day)		Amount
22.5.1	10	m3/day	13.00
22.5.2	15	m3/day	14.00
22.5.3	20	m3/day	17.00
22.5.4	30	m3/day	21.00
22.5.5	50	m3/day	36.00
22.5.6	90	m3/day	47.00
22.5.7	100	m3/day	51.00
22.5.8	200	m3/day	81.00
22.5.9	300	m3/day	115.00
22.5.10	500	m3/day	153.00
22.5.11	600	m3/day	213.00
22.5.12	700	m3/day	225.00
22.5.13	800	m3/day	230.00
22.5.14	1000	m3/day	276.00

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
22.6	MOVING MEDIA BIO REACTOR TECHNOLOGY		
	Moving Media Bio Reactor (MMBR)/FAB (Fluidised Aerated Bed) Process		
	<p>Designing, Providing and construction, hydraulic testing, commissioning and giving satisfactorily trials of STP consisting of Inlet Chamber, Screen Chamber. Grit Separator, MMBR/FAB (Based on technologies providing attached growth on plastic meddi kept suspended in the waste water due to low density of plastic and provided with compressed air for aeration with very high MLSS of greater than 15,000 Mg/l) tank. Secondary Clari settler, sludge sump, sludge Thickener, chlorine contact Tank, Chlorinator room/shed, Sludge Centrifuge, Associated Piping work with required valves, Gates, drains, pathways, Administration block cum Laboratory, Laboratory Equipments, Spares parts for 2 years of operation, etc. complete as turnkey job with all involved civil, as per detailed specification for civil electrical and mechanical components with all duties and taxes etc. complete to achieve BOD<10 PPM, COD<100 PPM, TSS<10 PPM, NH3N<5 PPM, TP<1 PPM, Treated sewage can be used for irrigation, horticulture purposes.</p>		
	Following Units are Included		
	1. Inlet Chamber		
	<p>Designing, Providing and construction RCC (M-30) inlet chamber designed for the peak flow including necessary excavation in all types of strata including walkway all around the periphery, Each compartment will have CI gates with extension rod, Head stock, operating wheels, GI Pipe railing etc. The work includes providing and making necessary arrangements to connect the flow to screen chamber by approach channel as directed and as per specification.</p>		
	2. Screen Chamber		
	<p>Designing, Providing and construction testing and commissioning of screen chamber, designed for peak flow in RCC (M-30), Including walkway 1.2 M wide with GI pipe.</p>		
	3. Grit Separator		
	<p>Designing, Providing and constructing detritor type grit removal mechanism in RCC (M-30) capable of removing 100% 0.2 mm size particle and above having specific gravity 2.30 designed for peak flow with suitable arrangement of separation of grit from putrescible solids including providing & making necessary arrangements of JB-1 inlet & outlet channels of required sizes as make be required to connect the flow to connecting unit etc. Complete including hydraulic testing for water tightness of structure having minimum FB of 0.3 m wash out arrangement to grit chamber & platform 1.2 m wide RCC walkway with GI pipe handling shall be provided, A pit for collecting grit conveyed by conveyor shall be provided. It should be suitable to handle the grit for carting, All arrangements shall be as detailed specifications and as directed.</p>		

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
4.	MMBR/FAB Tank		
	Designing, providing & constructing in RCC (M-30) biological reactor tank for removal of BOD along with nutrient removal to handle the average flow & having hydraulic suitable to handle peak flow conditions with suitable 1.2 M wide walkway, Expansion joints as required, including foundation etc. as per specification. The tank shall be equipped with inlet & outlet arrangement, air blowers for supply of air coarse bubble diffusers & aeration grid in SS 304, PP carrier bio media etc. FB of 0.5 M & SWD as required should be complete as per detailed specification.		
5.	Secondary Clarisettler		
	Designing, providing & constructing in RCC (M-30) water tight secondary Clarisettler having SWD of 3.75 m + 0.5 m FB & has tube media in the clarification zone to provide additional surface area for settling. The settler shall be provided with a scraper mechanism in MS with epoxy painting for collecting the settled solids at the bottom (bottom slope 1:12). The central feed well shall be made of MS with epoxy painting form both faces & well stiffened. The sewage will be admitted in the feed well & then will move outwards towards periphery slowly & continuously over a weir & will be collected in a launder.		
6.	Chlorine Contact Tank		
	Designing, providing & constructing chlorine contact tank of adequate capacity to deal with average flow. The contact time provided is 30 min. to achieve 99.99% reduction in coli form during average flow condition, Chlorine dosage will be as per standard provisions including designing, providing & construction water supply provision for chlorination, including providing dewatering & by pas arrangement for jointing to final effluent mains & outlet weir etc. complete. The effluent quality should match with the standards laid down by Madhya Pradesh Pollution Control Board & as per obligatory provision & as detailed specification & as directed by Engineer-In-Charge.		
7.	Chlorinator & Chlorinator Room/Tonner Room		
	Designing, Providing & construction of vacuum type Chlorinators having adequate capacity for dosage of adequate chlorine to ensure 99.99% coli form reduction as per obligatory provisions detailed specifications with necessary provision of having chlorinator room of adequate size. The chlorinator equipment shall include chlorine cylinders tonners, piping, valves, measuring, controlling equipments, safety devises, lifting equipment etc., complete as per IS-10553 (Part-II) 1982. The tonner room should have min. 3 MT capacity crane for loading & unloading facility. Tonner storage should be distinctly isolated and should have min.storage space as per the detailed specifications & as per gas law 1981 & factory act shall be provided. All other matching amenities shall be provided, 5 MT gantry rail shall be provided for full length of tonner room with outlet.		
8.	Sludge Sump		
	Designing Providing & construction of sludge sump and pump for discharging sludge to sludge thickener using M.S. Pipe complete as per detailed specification.		
9.	Sludge Thickener		

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
	Designing, Providing and construction water tight of sludge thickener gravity type in RCC (M-30) with inlet & outlet pipes, central feed well, sludge pit & sludge removal arrangement, grouting wherever necessary with walkway all around of 1.30 m with GI pipe railing interconnecting CI pipes all complete as per specifications, having bottom slope 1:8 & 3 m SWD with necessary fixed bridge scraper arrangement as per detailed specification & necessary inlet & outlet arrangement. All other arrangement as per detailed specifications.		
	10. Sludge centrifuge platform with centrifuge		
	Designing , providing, constructing and installing including foundation etc. sludge centrifuge to handle the sludge flow of 1 day in 18 hours per unit with sludge dewatering unit drain etc. complete as per specification . Sludge centrifuge with necessary arrangements as per detailed specification mentioned in tender and obligatory provisions to be provided with satisfactory functioning.		
	11. Outfall Sewer		
	Designing, Providing and constructing appropriate outfall sewer of RCC NP2 pipe to discharge treated effluent, untreated effluent from outlet chamber (after basin/chlorination tank) to the local Nallah at the point shown on the drawing including necessary chambers for inspection & cleaning including excavation, dewatering, refilling, concrete encasing I bedding concrete.		
	12. Pining work in CI - LA class including sluice valves, reflux valves, MS		
	Providing, laying & Jointing pipes other than those already included in the above items for interconnection by pass drain etc. of all units including adequate numbers of manhole chambers, The item includes excavations, refilling & hydraulic testing of pipes, valves, gates, accessories & cost of jointing materials. The item includes required channels with gates or interconnection of units, by pass drains etc. for all units as directed etc complete as per detailed specifications.		
	13. Administrative Building cum Laboratory (CH)		
	Designing, Providing and constructing administrative building, office cum laboratory including stores. This shall be building having appropriate carpet area & ground floor and at first floor complete as per specifications including necessary excavation, foundation in RCC M-20 framed structure, BB masonry (II class in CM 1:6) 20 mm cement plaster in CM 1:3 inside & outside painting, aluminum door window with glass panels, Mosaic tile flooring & skirting & all other allied items, fixtures, fastening, electrification arrangement, water supply arrangement etc complete, The building will have laboratory on upper floor of administrative building & should have complete control of every unit as per laboratory equipment, beautification. Telephone and intercom arrangement and wireless system.		
	Cost of plant with capacity	Unit	Rate (in Rs Lakhs)
22.6.2	Add per MLD above 1 MLD upto 3 MLD	MLD	75.00
22.6.3	Add per MLD above 3 MLD upto 5 MLD	MLD	72.00
22.6.4	Add per MLD above 5 MLD upto 8 MLD	MLD	69.00
20.6.5	Add per MLD above 8 MLD upto 10. MLD	MLD	66.00
20.6.6	Add per MLD above 10 MLD upto 13 MLD	MLD	63.00
22.6.7	Add per MLD above 13 MLD upto 15 MLD	MLD	60.00
22.6.8	Add per MLD above 15 MLD upto 18 MLD	MLD	57.00
22.6.9	Add per MLD above 18 MLD upto 20 MLD	MLD	55.00
22.6.10	Add per MLD above 20 MLD upto 25 MLD	MLD	52.00
22.6.11	Add Per MLD above 25 MLD	MLD	49.00

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
NOTES:-			
1. Screen chamber and grit separator upto 5 MLD capacity are considered as manual type.			
2. Upto 5 MLD capacity STP, chlorination shall be done by using sodium hypochlorite solution. Above 5 MLD capacity gas chlorinator to be provided.			
3. Sludge thickener is not provided upto 3 MLD capacity STP, Sludge will be collected into sludge sump & pumped directly to sludge dewatering system.			
4. For all STP sludge dewatering is using solid bowl centrifuge.			
5. Chlorinator room not considered for STP upto 3 MLD capacity. For STP upto 3 MLD, laboratory & administration building is not considered. Only a room for operator is considered.			
6. Boundary wall, fencing, gate, storm water drains, site clearance is not considered in scope.			
7. All water retaining structures are in M-30 grade of concrete.			
8. Water table is considered 5 M below GL for design.			
9. Grade for cement used is OPC 43 grade.			
10. Grade of steel used is fe 415.			
11. Peak factor considered for design for plants upto 3 MLD is 3.0, from 4 to 15 MLD is 2.5 & from 16 to 20 MLD is 2.0.			
12. Chemicals required during trial run & commissioning is not considered.			
13. Power available at STP location is assumed as LT power supply.			
14. All the structural steel works / fabrications are to be provided with application of Hot dip zinc coating according to specification as per IS 4759: 1996 (reaffirmed 2006)			
22.7	Sewage Treatment Plant (STP) - Sequential Batch Reactor		
	Designing , providing, constructing, hydraulic testing, commissioning and giving satisfactorily trials consisting of Wet well including pumping up to inlet chamber, Inlet Chamber, Screen Chamber, Detritus Tanks, Distribution Chamber and Biological SBR Basins, Sludge Sump, Chlorine Contact Tank, Chlorinator Room/Shed, Sludge Centrifuge, Pump House, necessary piping work with required valves, gates, drains, pathways, Administration Block cum Laboratory, Laboratory Equipments, Tools and Plants, Spare Parts, etc. complete as turnkey job with all involved civil, electrical and mechanical works inclusive of following items, units as per detailed specifications for civil, electrical and mechanical components with all duties and taxes etc. complete. to achieve BOD < 10ppm, COD < 50ppm, TSS < 10ppm, to get recyclable quality of water for industrial / agricultural purposes.		
UNITS INCLUDED:			
	Inlet Chamber : Designing , providing, and constructing RCC (M-30) inlet chamber for the peak flow of 2 DWF including necessary excavation in all types of strata including walkway all around the periphery. Each compartment will have phosper bronze, steel gates with extension rod, head stock, operating wheels, GI pipe railing etc. The work includes providing and making necessary arrangements to connect the flow to screen chamber by approach channel as directed and as per specifications.		
	Screen Chamber : Designing , providing, constructing, testing and commissioning of screen chamber, designed for average 1 DWF and maximum peak flow of 2 DWF in RCC (M -30), including walkway 1.2 m wide, inlet pipe/ channel from inlet chamber, outlet pipe / channel to detritus tank, free board of 0.5 m minimum, RCC walkway 1.2 m wide with GI pipe railing. RCC stair case of 1.2 m width from GL to screen chamber.		

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
	<p>Detritus Tank : Designing, providing and constructing continuously grit removal type of Detritus Tank, mechanically operated in RCC (M-30) capable of removing 100% 0.2 mm size particle and above, having specific gravity 2.30 designed for one peak 2 DWF with suitable arrangement of separation of grit from putrescible solids including providing, and making necessary arrangements of JB- 1. Inlet and outlet channels of required sizes as make be required to connect the flow to connecting unit etc. Complete including hydraulic testing for water tightness of structure having minimum FB of 0.3 m, wash out arrangement to Grit chamber and platform 1.2 m wide RCC walkway with GI pipe handling shall be provided. A pit for collecting grit conveyed by conveyor shall be provided. It should be suitable to handle the grit for carting. All arrangements shall be as detailed specifications and as directed.</p>		
	<p>SBR Basins: Designing, providing and constructing in RCC mixed (M-30), SBR basins for biological removal of BOD along with nitrification, denitrification, Bio- P removal in compartments to handle combine flow of 1 DWF, incoming flow and recirculation flow including construction of selector comaprtnents and providing 1.2 m wide clear approach walkways, expansion joints wherever necessary, including foundations etc as per specifications. Peak factor shall be 2, F/M ration shall be : 0.15, complete with air blowers, fine diffused aeration grid/ equipment and FB 0.6 m depth, SWD as required. DO level in SBR basin to be minimum 2 mg/l complete with "Oxygen Uptake Rate " control system and all related instruments, Stainless steel decanters and automation works. MLSS concentrations shall be 2000 - 5500 mg/l or more,MLVSS to MLSS ratio to be 0.8. HRT shall be between 12 to 16 hrs and SRT suitable for fully digested sludge.It should have all other related works as per detailed specification.</p>		
	<p>Chlorine Contact Tank: Designing providing and constructing chlorine contact chamber of adequate capacity to deal with 1DWF average flow. The chlorine contact tank should be of 30 min capacity, during average flow to achieve 99.99 % coli form reduction. Chlorine dose shall be maintained as per standard provisions , including designing, providing and constructing water supply provision for chlorination , including providing dewatering and by pass arrangement jointing to final effluent mains and outlet weir etc complete. The effluent quality should match with the standards laid down by the department, as per obligatory provision, as detailed specification and as directed by engineer in - charge.</p>		

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
	<p>Chlorinator and Chlorinator Room/Tonner Room: Designing, providing and constructing chlorinators vacuum type 2 Nos, with auto switchover facility and having capacity for dosage of adequate chlorine to ensure 99.99 % coliform reduction as per per obligatory provisions and detailed specifications with necessary provision of having chlorinator room of adequate size. The chlorinator equipment shall include cost of chlorine cylinders/tonner, piping, valves, measuring and controlling equipments, safety devices , lifting equipments, etc. complete as per IS -10553 (part II) 1982. The tonner room should have minimum 3 MT capacity crane for loading and unloading facility. Tonner storage should be distinctly isolated and should be for minimum storage space as directed in the design specification and as per gas laws 1981 and factory act shall be provided. All other matching amenities shall be provided, 5 MT gantry rail shall be provided for full length of tonner room at 6 m height from level of tonner room, with outlet chamber and treated effluent outlet channel etc complete as per detailed specification.</p>		
	<p>Sludge Sump: Designing, providing and constructing of sludge sump and pump house of appropriate size with pumps, ceiling height minimum 6 m over sump for discharging sludge to centrifuge and recycling of flow for blending of sludge using CI pipe complete as per detailed specification.</p>		
	<p>Sludge Centrifuge Platform with Centrifuges: Designing, providing, constructing and installing including foundation etc, sludge centrifuge to handle the sludge flow of 1 day in 20 hours per unit with sludge dewatering unit drain etc complete as per specification. sludge centrifuges with the necessary arrangement as per detailed specification mentioned in tender and obligatory provisions to be provided with satisfactory functioning.</p>		
	<p>Outfall Sewer: Designing, providing and constructing appropriate outfall sewer of RCC NP2 pipe, to discharge treated effluent, untreated effluent from outlet chamber (after SBR basin/ chlorination tank) to the local Nallah at the point shown on the drawing including necessary chambers for inspection and cleaning including necessary excavation, dewatering, refilling, concrete encasing/bedding concrete steps to reach the nallah bed level. pitching and energy dissipation chamber in nallah portion etc. complete upto 50 m length RCC NP2 pipe line and including all above items.</p>		
	<p>Piping work in CI Class-LA including Sluice valves, Reflux Valves, MS Gates: Providing laying and jointing pipes other than those already included in the above items for interconnection by - pass drains etc. of all units including adequate numbers of manhole chambers. The item includes excavations, refilling and hydraulic testing of pipes, valves, gates, accessories and cost of jointing materials. The items includes required channels with gates for interconnection of units by pass drains etc for all units as directed etc complete as per detailed specifications</p>		

Sr. No.	Particulars of Items	Unit	Rate (Rs. in Lakh)
	Administrative Bulding cum Laboratory (G+1): Designing, providing and constructing administrative building, office cum Laboratory including stores. This shall be a building having appropriate carpet area and ground floor and at first floor complete as per specifications including necessary excavation, foundation in RCC M-20 framed structure brick masonry (11- class in C.M. 1:6) 20 mm cement plaster in C.M 1:3 inside and outside painiting. Aluminium door and window with glass pannels, mosaic tile flooring and skirting and all other allied items, fixtures fastening electrification arrangement water supply arrangement etc complete. The building will have laboratory on upper floor of administrative building and should be so centralized that it should not be attached with any unit but should have complete control of every unit as per laboratory equipment, beautification, telephone and intercom arrangement and wireless system.Staff Quarters as per CPHEEO Manual for Operation and maintenance purpose.		
	Cost of plant with capacity (Min. No of basins)	Unit	Rate (in Rs Lakhs)
22.7.1	Cost of 1 MLD (Min. No. of basins -2)	MLD	326.00
22.7.2	Add per MLD above 1 MLD upto 2 MLD (Min. No. of basins -2)	MLD	110.00
22.7.3	Add per MLD above 2 MLD upto 5 MLD (Min. No. of basins -2)	MLD	90.00
22.7.4	Add per MLD above 5 MLD upto 10 MLD (Min. No. of basins -2)	MLD	87.00
22.7.5	Add per MLD above 10 MLD upto 15 MLD(Min. No. of basins -4)	MLD	84.00
22.7.6	Add per MLD above 15 MLD upto 20 MLD (Min. No. of basins -4)	MLD	80.00
22.7.7	Add per MLD above 20 MLD upto 25 MLD (Min. No. of basins -4)	MLD	78.00
22.7.8	Add per MLD above 25 MLD upto 30 MLD (Min. No. of basins -4)	MLD	75.00
22.7.9	Add per MLD above 30 MLD upto 40 MLD (Min. No. of basins -4)	MLD	73.00
22.7.10	Add per MLD above 40 MLD upto 50 MLD (Min. No. of basins -4)	MLD	71.00
22.7.11	Add per MLD above 50 MLD upto 60 MLD (Min. No. of basins -4)	MLD	69.00
22.7.12	Add per MLD above 60 MLD upto 75 MLD (Min. No. of basins -4)	MLD	67.00
22.7.13	Add per MLD above 75 MLD upto 100 MLD (Min. No. of basins -4)	MLD	63.00
22.7.14	Add per MLD above 100 MLD upto 125 MLD (Min. No. of basins -6)	MLD	62.00
22.7.15	Add per MLD above 125 MLD upto 150 MLD (Min. No. of basins -6)	MLD	58.00
22.7.16	Add per MLD above 150 MLD (Min. No. of basins -6)	MLD	50.00
22.8	Construction of Intermediate Sewage Pumping station with Pump house including Boundary, Approach road, Gate, site development & all necessary electrical and mechanical accessories. Job includes Pumps and required associated works to complete the job in all respect		
22.8.1	Cost of 1 MLD	MLD	8.00
22.8.2	Add per MLD above 1 MLD	MLD	5.00
22.9	Construction of Sewage lift station with Pumps and all necessary electrical and mechanical accessories . Job includes Pumps and required associated works to complete the job in all respect excluding cost of manholes/ Septic tanks		
22.9.1	Cost of 100 KLD	Job	1.00
22.9.2	Add extra per 100 KLD, above 100 KLD	100 KLD	0.75

CHAPTER 23

GROUND SERVICE RESERVOIR & SUMPS TANKS

Notes : (In this chapter items are only for estimating purpose, shall not be considered for the direct payment of the work to the contractor).

- 1 Applicable Codes :-
 - IS 15472-2004 Guidelines for planning and design of low level outlets for evacuating storage reservoirs.
 - IS 5477 (Part 1- Fixing the capacities of reservoirs
 - IS 6939 - 1992 Methods for determination of evaporation from reservoirs
 - IS 7323 - 1994 Operation of reservoirs - Guidelines
 - IS 3370 Part-I, Code of practice for the Reinforced Concrete structure for the storage of liquids.
II & IV
 - IS 456 Code of practice for the plain and Reinforced Concrete.
 - IS 269 Code of practice for portland cement
 - IS 383 Code of practice for aggregates
 - IS 432 (Part-I) Code of practice for Mild Steel and Medium tensile steel bars.
 - IS 1786 Code of practice for Cold twisted steel bars
 - IS 226 Code of practice for Structural steel sections
- 2 Earth work shall be done as per IS 1200 (Part-1) : 1992
- 3 Excavation shall be done as per safety codes IS 3764 : 1992
- 4 Concrete work shall be done as per IS 456 : 2000
- 4.1 As per IS 3370 , Parts of structure neither in contact with liquid on any face
- 4.2 The minimum quantity of cement in the concrete mix shall not be less than 330 kg per cum and maximum quantity of cement in the concrete mix shall not exceed 530 kg per cum in reinforced concrete works
- 5 Cement shall be used as IS standard given below :-
 - 5.1 When the strength of concrete required is upto M-20, then O.P.C. Conforming to IS 269-1989 or PSC (Portland Slag Cement) may be used.
 - 5.2 When the strength of concrete required is more than M-20 but upto M-30, then O.P.C. Conforming to IS : 8112 - 1989 shall be used.
 - 5.3 Pozzolona cement is now being widely produced all over country. This may be used in structures in contact with water as per I.S. code. In specific cases requiring higher grade of strength, use of Ordinary Portland Cement (OPC) should invariably be ensured.

- 6 Sand
Sand shall not contain dust, lumps, soft or flaky materials. Fine aggregate having positive alkali silica reaction shall not be used. All fine aggregate shall confirm to IS : 383. The fineness modular of fine aggregate shall neither be less than 2.0 nor greater than 3.5. Sand to be used in work shall conform to IS 1542-1960 for plaster and IS 166-1965 for masonry work.
- 7 Coarse aggregate
- 7.1 Coarse aggregate consist of clear, hard, strong, dense, nonporous and durable pieces of crushed stone. They shall not consist pieces of elongated particles salt, alkali, vegetable matter or other deleterious material.
- 7.2 All coarse aggregate shall conform to IS : 383 & tests for conformity shall be carried out as per IS: 2386 Part I to VIII. The maximum value of flakiness index for coarse aggregate shall not exceed 35%.
- 8 Mortar
- 8.1 The mortar mixing shall preferably be done in mechanical mixer operated manually or by power.
- 9 Curing shall be commenced as soon as mortar used for finishing has hardened sufficiently and not to be damaged during curing. It shall be kept wet for a period of at least 7 days.
- 10 Service Reservoirs are structures which are built at any convenient point in the distribution between the original source and the consumer's end. The capacity of reservoirs depends upon the type of supply, the necessity of catering for peak demand periods and the provision of reserve to cover normal break down or maintenance interruptions.
- 11 Location of Reservoirs : It is decided on following considerations :-
- 11.1 Location of reservoir in central point with respect to distribution area.
- 11.2 Location near the beginning of the system.
- 11.3 Location of the reservoir site depends on the availability of land at suitable altitudes.
- 12 Measurements :-
All Measurements shall be of the finished work.
- 13 Rates :-
- 13.1 The rates includes charges for all tools & plants, chain pulley blocks, other appliances etc. required for lifting and laying the pipes and specials in positions as per approved drawing.
- 13.2 The rates include provision and use of all coverings etc. to protect the works from inclement weather etc. and from damages from falling materials and other causes.
- 13.3 The rates include provision of handling, storing under cover as required and returning of empty cases or containers or bags to the Municipal Stores without any extra cost for such materials as may be supplied by the department.

CHAPTER 23 - GROUND SERVICE RESERVOIR & SUMPS TANKS

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
23.1	R.C.C. Ground Service Reservoirs & Sumps		
23.1.1	Upto 25,000 Litres	Per lit	12.20
23.1.2	Cost of 25,000 Litres Capacity	Job	305119.00
23.1.3	Add for capacity 25,000 to 50,000 Litres	per lit	9.63
23.1.4	Cost of 50,000 Litres Capacity	Job	545800.00
23.1.5	Add for capacity 50,000 to 75,000 Litres	per lit	5.99
23.1.6	Cost of 75,000 Litres Capacity	Job	695625.00
23.1.7	Add for capacity 75,000 to 1,00,000 Litres	per lit	5.40
23.1.8	Cost of 1,00,000 Litres Capacity	Job	830729.00
23.1.9	Add for capacity 1,00,000 to 1,50,000 Litres	per lit	5.12
23.1.10	Cost of 1,50,000 Litres Capacity	Job	1086761.00
23.1.11	Add for capacity 1,50,000 to 2,00,000 Litres	per lit	4.79
23.1.12	Cost of 2,00,000 Litres Capacity	Job	1326194.00
23.1.13	Add for capacity 2,00,000 to 2,50,000 Litres	per lit	4.45
23.1.14	Cost of 2,50,000 Litres Capacity	Job	1548782.00
23.1.15	Add for capacity 2,50,000 to 3,00,000 Litres	per lit	3.95
23.1.16	Cost of 3,00,000 Litres Capacity	Job	1746143.00
23.1.17	Add for capacity 3,00,000 to 5,00,000 Litres	per lit	3.54
23.1.18	Cost of 5,00,000 Litres Capacity	Job	2455019.00
23.1.19	Add for capacity 5,00,000 to 10,00,000 Litres	per lit	2.98
23.1.20	Cost of 10,00,000 Litres Capacity	Job	3943666.00
23.1.21	Add for capacity 10,00,000 to 15,00,000 Litres	per lit	2.42
23.1.22	Cost of 15,00,000 Litres Capacity	Job	5153570.00
23.1.23	Add for capacity above 15,00,000 Litres	per lit.	1.91

CHAPTER 24

REINFORCED CEMENT CONCRETE ELEVATED SERVICE RESERVOIRS

Notes : (In this chapter items are only for estimating purpose, shall not be considered for the direct payment of the work to the contractor).

- 1 Scope
- 1.1 The Specification covers guidelines for layout for overhead water tanks and Criteria for analysis for RCC staging both for steel and concrete tanks.
- 2 Applicable Codes
 - IS: 11682-1985 Reaffirmed 1991, 98 Specifications for Criteria for Design of RCC Staging for overhead Water Tanks.
 - IS 3370 Part-I, II & IV Code of practice for the Reinforced Concrete structure for the storage of liquids.
 - IS 456 Code of practice for the plain and Reinforced Concrete.
 - IS 269 Code of practice for portland cement
 - IS 383 Code of practice for aggregates
 - IS 432 (Part-I) Code of practice for Mild Steel and Medium tensile steel bars.
 - IS 1786 Code of practice for Cold twisted steel bars
 - IS 226 Code of practice for Structural steel sections
- 3 Earth work shall be done as per IS 1200 (Part-1) : 1992
- 4 Excavation shall be done as per safety codes IS 3764 : 1992
- 5 Concrete work shall be done as per IS 456 : 2000
- 5.1 As per IS 3370 , Parts of structure neither in contact with liquid on any face nor enclosing the space above the liquid, concrete mix less than M 20 shall not be used.
- 5.2 The minimum quantity of cement in the concrete mix shall not be less than 330 kg per cum and maximum quantity of cement in the concrete mix shall not exceed 530 kg per cum in reinforced concrete works
- 6 Cement shall be used as IS standard given below :-
 - 6.1 When the strength of concrete required is upto M-20, then O.P.C. Conforming to IS 269-1989 or P.P.C. Conforming to IS : 1498-1976 may be used.
 - 6.2 When the strength of concrete required is more than M-20 but upto M-30, then O.P.C. Conforming to IS : 8112 - 1989 shall be used.

6.3 Pozzolona cement is now being widely produced all over country. This may be used in structures in contact with water as per I.S. code. In specific cases requiring higher grade of strength, use of Ordinary Portland Cement (OPC) should invariably be ensured.

7 Sand

7.1 Sand is the fine aggregate which is obtained either from natural source like river bank or from pits etc. Sand can also be produce by crushing stone are gravels. It should pass through 4.75 mm IS sieve.

7.2 Sand should be free from clay, dust or silt. The permissible limit for the same is 5% by weight.

7.3 Sand should be free from organic impurities as determined is in accordance with IS : 2386 (Part-II)

7.4 For plaster sand used should Conform to IS : 1542/1960

7.5 For masonry work sand used should Conform to is : 166/1965

8 Other I.S. Codes not Specifically mentioned here but pertaining to the use of Electricially Welded Steel pipes shall form part of these Specifications.

9 Capacity : Capacity of the tank shall be the volume of water it can store between the designed full supply level and lowest supply level (that is, the level of the lip of the outlet pipe). Due allowance shall be made for plastering the tank from inside if any when calculating the capacity of tank.

10 Height of Staging : Height of staging is the difference between the lowest supply level of tank and the average ground level at the tank site.

11 Water Depth :- Water depth in tank shall be difference of level between lowest supply level and full supply level of the tank.

12 Seismic Forces :- When seismic loading is considered, following two cases may be considered :

12.1 Tank empty :

12.2 Tank full

The seismic force acting on the support for the tank and its analysis shall be in accordance with IS : 1893 - 1975.

13 Staging and other reinforced concrete members including foundation shall be designed in accordance with the requirements of IS : 456-1978. Increase in permissible stresses for column staging shall be as per IS : 456-1978.

13.1 The staging height of 10mtr. has been considered for the computation of the rates of ESR.

- 14 Generally the shape and size of elevated concrete tanks for economical design depends upon the functional requirements such as :
- 14.1 Maximum depth for water ;
 - 14.2 Height of staging :
 - 14.3 Allowable bearing capacity of foundation strata and type of foundation suitable :
 - 14.4 Capacity of tank;
 - 14.5 Other site conditions.
- 15 **Measurement:**
- 15.1 All the measurement shall be recorded under the relevant item of the work.
- 16 **Rates**
- The rate shall include the cost of materials and labour involved in all the operations except for the items measured/ enumerated separately under clause 'Measurements', which shall be paid for separately.

CHAPTER 24 - REINFORCED CEMENT CONCRETE ELEVATED SERVICE
RESERVOIRS

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
24.1	Designing (structurally & aesthetically), and constructing RCC elevated service reservoirs of following capacity with RCC staging consisting of columns, internal and external bracings spaced vertically as per staging of the ESR. including excavation in all types of strata, foundation concrete, cement plaster with water proofing compound to the inside face of the container including refilling & disposing off the surplus stuff within a lead of 50 meters, all labour and material charges including lowering, laying, erecting, hoisting and jointing of pipe assembly of inlet, outlet, scour, overflow and bypass arrangements as per departmental design, providing and fixing accessories such as Stainless steel Ladder inside and MS ladder with GI railing outside, C.I. manhole frame and covers, water level indicators, lightening conductor, G.I. pipe railing around walk way and top slab, providing staircase from ground level to roof level, M.S. grill gate of 2 mtr. height with locking arrangement of approved design , Brick masonry chambers for all valves, ventilating shafts,		
	providing and applying three coats of cement paint to the structure including roof slab, epoxy painting to internal surface & anti termite treatment for underground parts of the structure and giving satisfactory water tightness test as per I.S. code, The job to include painting the name of the scheme and other details on the reservoir as per the directions of Engineer-in-Charge.		
Note	The cost may change as per site condition looking to the uplift and type of strata .		
1	The design of the structure be in accordance with relevant (I.S. 3370 - 1965 or revised)		
2	The design shall satisfy the stipulations as per IS 1893-1984 and I.S. 13920/1993 for seismic force and I.S. 11682/1985 for R.C.C. staging of overhead tanks.		
3	For design having more than 6 columns, provision of internal bracing is obligatory. External bracing is also obligatory.		
4	The entire structure shall be in M-30 mix only.		
5	Round mild steel bars grade - 1 Conforming to I.S. 432 part-I or high yield strength deformed bars Conforming to I.S. 1786 shall be used, grade-II mild steel bars will not be allowed.		
6	Irrespective of the type of foundation proposed in the design, one set of bracing be provided at the ground level.		
7	These rates includes providing M.S. ladder for E.S.R.'s upto 2 lakh litres capacity and providing spiral staircase for E.S.R. above 2 lakh litres capacity.		
9	Staging shall have to be designed with stresses of M-25 for E.S.R. However all RCC construction should be done in M-30.		

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
10	These rates are including the cost of uplift pressure if any and entire dewatering during execution. In case of water logging area where water is struck at shallow depth, extra provision of dewatering shall be made as per site conditions.		
11	The rates indicated in the table are including the cost of pipes, specials and valves required for inlet, outlet, washout, overflow and by-pass arrangement. The scope of work, however and includes cost of erecting, laying and jointing of pipes and valves including cost of jointing materials upto 5 m beyond outer face of outermost column.		
12	For ESR upto 500 Cum capacity , M.S. with epoxy or DI with CM lining double flanged pipes upto 300 mm dia shall be provided and DI specials shall be used.		
	For ESR above 500 Cum capacity, M.S. with epoxy or DI with CM lining pipe assembly with minimum 8 m.m. thickness up to 500 mm dia and minimum 10 mm thickness above 500 mm dia can be used with proper anticorrosive epoxy treatment from inside and outside.		
13	The rates are applicable for staging height of 10 m. These rates shall be increased or decreased for per metre variation in this staging height as below.		
	10 to 16 m staging - 2% per metre.		
	16 to 20 m staging - 3% per metre		
	20 m and above - 4% per metre		
	i.e. for 17 m staging height		
	Percentage calculation will be like below.		
	10 to 16 m = 6 x 2 = 12%		
	16 to 17 m = 1 x 3 = 3%		
	Total = 15%		
	For 21 m staging height		
	Percentage calculation will be like below.		
	10 to 16 m = 6 x 2 = 12%		
	16 to 20 m = 4 x 3 = 12%		
	20 to 21 m = 1 x 4 = 4%		
	Total = 28%		
24.1.1	upto 25,000 litres	Per Litre	29.90
24.1.2	Cost of 25,000 Litres capacity E.S.R.	Job	747459.00
24.1.3	Add for capacity above 25,000 upto 50,000 litres	Per Litre	16.47
24.1.4	Cost of 50,000 Litres capacity E.S.R.	Job	1159152.00
24.1.5	Add for capacity above 50,000 upto 75,000 litres	Per Litre	12.65
24.1.6	Cost of 75,000 Litres capacity E.S.R.	Job	1230136.00
24.1.7	Add for capacity above 75,000 upto 1,00,000 litres	Per Litre	8.82
24.1.8	Cost of 1,00,000 Litres capacity E.S.R.	Job	1450694.00
24.1.9	Add for capacity above 1,00,000 upto 1,50,000 litres	Per Litre	7.12
24.1.10	Cost of 1,50,000 Litres capacity E.S.R.	Job	1572916.00
24.1.11	Add for capacity above 1,50,000 upto 2,00,000 litres	Per Litre	5.41
24.1.12	Cost of 2,00,000 Litres capacity E.S.R.	Job	1843462.00
24.1.13	Add for capacity above 2,00,000 upto 2,50,000 litres	Per Litre	5.10
24.1.14	Cost of 2,50,000 Litres capacity E.S.R.	Job	2070100.00
24.1.15	Add for capacity above 2,50,000 upto 3,00,000 litres	Per Litre	4.80
24.1.16	Cost of 3,00,000 Litres capacity E.S.R.	Job	2310028.00
24.1.17	Add for capacity above 3,00,000 upto 4,00,000 litres	Per Litre	4.52

Sr. No.	Particulars of Items	Unit	Rate (in Rs.)
24.1.18	Cost of 4,00,000 Litres capacity E.S.R.	Job	2762285.00
24.1.19	Add for capacity above 4,00,000 upto 5,00,000 litres	Per Litre	4.26
24.1.20	Cost of 5,00,000 Litres capacity E.S.R.	Job	3187834.00
24.1.21	Add for capacity above 5,00,000 upto 7,50,000 litres	Per Litre	3.95
24.1.22	Cost of 7,50,000 Litres capacity E.S.R.	Job	4782341.00
24.1.23	Add for capacity above 7,50,000 upto 10,00,000 Litres	Per Litre	3.67
24.1.24	Cost of 10,00,000 Litres capacity E.S.R.	Job	5413256.00
24.1.25	Add for capacity above 10,50,000 upto 15,00,000 Litres	Per Litre	3.37
24.1.26	Cost of 15,00,000 Litres capacity E.S.R.	Job	7919177.00
24.1.27	Add for capacity above 15,00,000 upto 20,00,000 ltrs	Per Litre	3.07
24.1.28	Cost of 20,00,000 Litres capacity E.S.R.	Job	8920105.00
24.1.29	Add for capacity above 20,00,000 upto 25,00,000 Litres	Per Litre	2.79
24.1.30	Cost of 25,00,000 Litres capacity E.S.R.	Job	10047543.00
24.2	ESR Management System		
	Designing, Supplying, Installing, Commissioning & testing of Flow Control Valve with level control / Pressure reducing valve/ Altitude Valve for inlet/ outlet with flow controlling, pressure controlling & monitoring on web and to the pipeline feeding to ESR/MBR/GSR with cable, PLC SCADA etc. complete.		
24.2.1	80 mm dia	Each	118166.00
24.2.2	100 mm dia	Each	126717.00
24.2.3	150 mm dia	Each	163576.00
24.2.4	200 mm dia	Each	206052.00
24.2.5	250 mm dia	Each	274691.00
24.2.6	300 mm dia	Each	323633.00
24.2.7	350 mm dia	Each	411609.00
24.2.8	400 mm dia	Each	536270.00
24.2.9	450 mm dia	Each	573668.00
24.2.10	500 mm dia	Each	749656.00
24.2.11	550 mm dia	Each	1073774.00
24.2.12	600 mm dia	Each	1073774.00

List of IS Related To Water Supply & Sanitary Engineering

List of IS Related To Water Supply & Sanitary Engineering

S.No.	IS No.	Title
A	General	
1	SP 7 (Part 9 Section 1): 1983	National Building code of India 1983 Part 9 plumbing services: Section 1: Water Supply
2	SP 35 : 1987	Handbook on water supply and drainage with special emphasis on plumbing
3	IS 1172 : 1983	Code of basic requirements for water supply drainage and sanitation (third revision)
4	IS 2065 : 1983	Code of practice for water supply in buildings (second revision)
5	IS 269 : 1989	33 grade ordinary Portland cement (fourth revision)
6	IS 8112 : 1989	43 grade ordinary Portland cement
7	IS 12269 : 1987	53 grade ordinary Portland cement
8	IS 1489 : 1991	Portland pozzolana cement
	Part 1 : 1991	Fly ash based
	Part 2 : 1991	Calcined clay based
9	IS 1786 : 1985	High strength deformed steel bars and wires for concrete reinforcement.
10	IS 875 : 1987	Code of practice for design loads for buildings and structures
	Part 1 : 1987	Dead loads
	Part 2 : 1987	Imposed loads
	Part 3 : 1987	Wind loads
	Part 4 : 1987	Snow loads
11	Part 5 : 1987 IS 13920 : 1993	Special loads and load combinations Ductile detailing of reinforced concrete structures subjected to seismic forces.
12	IS 1893 : 2002	Criteria for earthquake resistant design of structure.
13	IS 456 : 2000	Code of practice for plain and reinforced concrete (third revision)
14	IS 457 : 1957	Code of practice for general construction of plain and reinforced concrete for dams and other massive structures.
15	IS 1343 : 1980	Code of practice for prestressed concrete (first revision)
16	IS 3103 : 1975	Code of practice for industrial ventilation.
17	IS 3370 : 1965	Code of practice for concrete structure for the storage of liquids.
	Part 1 : 2009	General requirements
	Part 2 : 2009	Reinforced concrete structures

S.No.	IS No.	Title
	Part 3 : 1967	Prestressed concrete structures
	Part 4 : 1967	Design tables
18	IS 6518 : 1972	Code of practice for control of sediment in reservoirs
19	IS 5330 : 1984	Criteria for design of anchor block for penstocks with expansions joints (first revision)
20	IS 6748 : 1973	Recommendations for watershed management relating to soil conservation.
	Part 1 : 1973	Agronomic aspects
21	IS 7357 : 1974	Code of practice for structural design of tanks.
22	IS 3913 : 1966	Suspended sediment load samplers.
23	IS 3917 : 1966	Scope type bed material samplers.
24	IS 4890 : 1968	Methods for measurement of suspended sediment in open channels.
25	IS 4926 : 1979	Ready – mixed concrete (first revision)
26	IS 6295 : 1986	Code of practice for water supply and drainage high altitudes and / or sub-zero temperate regions (first revision).
27	IS 4880	Code of practice for design of tunnels conveying water.
	Part 1 : 1975	General Design.
	Part 2 : 1976	Geometric design (first revision)
	Part 3 : 1976	Hydraulic design (first revision)
	Part 4 : 1971	Structural design of concrete lining in rock.
	Part 5 : 1972	Structural design of concrete lining in soft strata and soils.
	Part 6 : 1971	Tunnel support
28	IS 5477	Methods for fixing the capacities of reservoirs.
	Part 1 : 1969	General Requirements
	Part 2 : 1969	Dead storage
	Part 3 : 1969	Live storage
	Part 4 : 1971	Flood storage
29	IS 9668 : 1980	Code of practice for provision and maintenance of water supply for fire fighting.
30	IS 8062	Code of practice for cathodic protection for steel structures
	Part 1 : 1976	General principles
	Part 2 : 1976	Underground pipelines
31	IS 10221 : 1982	Code of practice for coating and wrapping of underground steel pipelines.

S.No.	IS No.	Title
32	IS 12183 : 1987	Code of practice for plumbing in multistoried buildings Part 1 Water Supply.
B	Pipe and Pipe laying	
	Cast Iron	
1	IS 1536 : 1976	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage (second revision)
2	IS 1537 : 1976	Vertically cast iron pressure pipes for water, gas and sewage (first revision)
3	IS 1538 (Parts 1 to 24)	Cast Iron fittings for pressure pipes for water, gas and sewage (second revision)
	Part 1 : 1976	General requirements
	Part 2 : 1976	Specific requirements for sockets and spigots of pipes
	Part 3 : 1976	Specific requirements for sockets and fittings
	Part 4 : 1976	Specific requirements for flanges of pipes and fittings
	Part 5 : 1976	Specific requirements for raised flanges
	Part 6 : 1976	Specific requirements for standard flange drilling of flanged pipes and fittings
	Part 7 : 1976	Specific requirements for flanged sockets
	Part 8 : 1976	Specific requirements for flanged spigots
	Part 9 : 1976	Specific requirements for double socket bends
	Part 10 : 1976	Specific requirements for double socket bends
	Part 11 : 1976	Specific requirements for TEEs and sockets
	Part 12 : 1976	Specific requirements for double sockets tee with flanged branch
	Part 13 : 1976	Specific requirements for crosses, all sockets
	Part 14 : 1976	Specific requirements for double socket tapers (third revision)
	Part 15 : 1976	Specific requirements for caps
	Part 16 : 1976	Specific requirements for plugs
	Part 17 : 1976	Specific requirements for bell mouth pipes
	Part 18 : 1976	Specific requirements for double flanged bends

S.No.	IS No.	Title
	Part 19 : 1976	Specific requirements for all flanged tees
	Part 20 : 1976	Specific requirements for all flanged crosses
	Part 21 : 1976	Specific requirements for double flanged taper
	Part 22 : 1976	Specific requirements for split puddle or body flanges
	Part 23 : 1976	Specific requirements for blank flanges
	Part 24 : 1984	Specific requirements for all flanged tees (second revision)
4	IS 1879 : 1975 Part 1 to 10	Specific requirements for all flanged tees (second revision)
5	IS 3114 : 1985	Code of practice for laying of cast iron pipes (third revision)
6	IS 782 : 1978	Caulking lead (third revision)
7	IS 6163 : 1978	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage (first revision)
8	IS 7181 : 1986	Horizontally cast iron double flanged pipes for water, gas and sewage (first revision)
9	IS 8329 : 1977	Centrifugally cast (spun) ductile iron pressure pipes for water, gas and sewage
10	IS 9523 : 1980	Ductile iron fittings for pressure pipes for water, gas and sewage
11	IS 11606 : 1986	Methods of sampling cast iron pipes and fittings
12	IS 11906 : 1986	Recommendations for cement mortar lining cast iron, mild steel and ductile iron pipes and fittings for transportation of water.
13	IS 12288 : 1987	Code of practice for laying of ductile iron pipes
	Concrete Pipes	
14	IS 458 : 1971	Concrete pipes (with and without reinforcements) (second revision)
15	IS 784 : 1978	Pre-stressed concrete pipes (including fittings) (first revision)
16	IS 1916 : 1963	Steel cylinder reinforced concrete pipes
17	IS 3597 : 1985	Methods of test for concrete pipes (first revision)
18	IS 783 : 1985	Code of practice for laying of concrete pipes (first revision)

S.No.	IS No.	Title
19	IS 4350 : 1967	Concrete porous pipes for under drainage
	Asbestos Cement Pipes	
20	IS 1592 : 1980	Asbestos cement pressure pipes (second revision)
21	IS 6530 : 1972	Code of practice for laying of asbestos cement pressure pipes
22	IS 5531 : 1977	Cast iron specials for asbestos cement Pressure pipes for water, gas and sewage (first revision)
23	IS 9627 : 1980	Asbestos cement pressure pipes (light duty)
	Mild Steel Tubes and Pipes	
24	IS 1239	
	Part 1 : 1979	Mild steel tubes, tubular and other wrought steel fittings.
	Part 2 : 1982	Mild Steel tubes (fourth revision)
25	IS 1978 : 1982	Mild Steel tubular and other wrought steel pipe fittings (third revision)
26	IS 3589 : 1981	Line Pipe
27	IS 4270 : 1983	Electrically welded steel pipes for water, gas and sewage (150 to 2000 mm nominal size) (first revision)
28	IS 4516 : 1968	Steel tubes used for water wells (first revision)
29	IS 5504 : 1969	Elliptical mild steel tubes
30	IS 5822 : 1986	Spiral welded pipes
31	IS 4711 : 1974	Code of practice for laying of welded steel pipes for water supply (first revision)
32	IS 4736 : 1986	Method for sampling of steel pipes, tubes and fittings (first revision)
33	IS 6286 : 1971	Hot-dip zinc coatings on mild steel tubes (first revision)
34	IS 6631 : 1972	Seamless and welded steel pipes for sub zero temperature services
35	IS 11722 : 1968	Steel pipes for hydraulic purpose
	Plastic Pipes	
36	IS 3076 : 1985	Thin welded flexible quick coupling pipes
37	IS 4984 : 1987	Low density polyethylene pipes for potable water supplies (second revision)
38	IS 4985 : 1988	High density polyethylene pipes for potable water supplies, sewage and industrial effluents (third revision)

S.No.	IS No.	Title
39	IS 12818 : 1989	Unplasticized PVC pipes for potable water supplies (second revision)
40	IS 7634	UPVC ribbed and casing pipes for potable water supply
	Part 1 : 1975	Code of practice for plastic pipe work for potable water supplies.
	Part 2 : 1975	Choice of materials and general recommendation
	Part 3 : 1975	Laying and Jointing polyethylene (PE) pipes.
41	IS 7834	Laying and Jointing of unplasticized PVC pipes.
	Part 1 : 1975	Injection molded PVC fittings with solvent cement joints for water supplies.
	Part 2 : 1975	General requirements
	Part 3 : 1975	Specific requirements of 45 degree elbows
	Part 4 : 1975	Specific requirements for 900 elbows
	Part 5 : 1975	Specific requirements for 900 tees
	Part 6 : 1975	Specific requirements for 450 tees
	Part 7 : 1975	Specific requirements for sockets
	Part 8 : 1975	Specific requirements for unions
42	IS 8008	Specific requirements for caps
	Part 1 : 1976	Injection moulded HDPE fittings for potable water supplies
	Part 2 : 1976	General requirements
	Part 3 : 1976	Specific requirements for 900 bends
	Part 4 : 1976	Specific requirements for 900 tees
	Part 5 : 1976	Specific requirements for reducers
	Part 6 : 1976	Specific requirements for ferrule
	Part 7 : 1976	Specific requirements for pipe ends
43	IS 8360	Specific requirements for sandwich flange
	Part 1 : 1977	Fabricated high density polyethylene (HDPE) fittings for potable water supplies
	Part 2 : 1977	General requirements
	Part 3 : 1977	Specific requirements for 900 tees
	IS 10124	Specific requirements for 900 bends
	Part 1 : 1988	Fabricated PVC fittings for potable water supplies
	Part 2 : 1988	General requirements
	Part 3 : 1988	Specific requirements for sockets (first revision)
	Part 4 : 1988	Specific requirements for straight reducers (first revision)
	Part 5 : 1988	Specific requirements for caps (first revision)

S.No.	IS No.	Title
	Part 6 : 1988	Specific requirements for equal tees (first revision)
	Part 7 : 1988	Specific requirements for flanged in to pieces with metallic flanges (first revision)
	Part 8 : 1988	Specific requirements for threaded adaptors (first revision)
	Part 9 : 1988	Specific requirements for 90 degree bends (first revision)
	Part 10 : 1988	Specific requirements for 60 degree bends (first revision)
	Part 11 : 1988	Specific requirements for 45 degree bends (first revision)
	Part 12 : 1988	Specific requirements for 30 degree bends (first revision)
	Part 13 : 1988	Specific requirements for 22 1/2 degree bends (first revision)
		Specific requirements for 11 1/4 degree bends (first revision)
45	IS 12231 : 1988	UPVC pipes for use in suction and delivery of agriculture pump.
46	IS 12235	Methods of test for unplasticized PVC pipes for potable water supplies.
	Part 1 : 1986	Methods for measurement of outside diameter.
	Part 2 : 1986	Methods for measurement of Diameter
	Part 3 : 1986	Test for Opacity
	Part 4 : 1986	Determining the detrimental effect on the composition of water
	Part 5 : 1986	Reservoir test
	Part 6 : 1986	Stress relief test
	Part 7 : 1986	Test for resistance of sulphuric acid
	Part 8 : 1986	Internal hydrostatic pressure test.
	Part 9 : 1986	Impact strength test
	Part 10 : 1986	Method for determination of organizing as aqueous solution.
	Part 11 : 1986	Extractability of cadmium and mercury occurring as impurities
47	IS 12709 : 1989	Specification for glass fiber reinforced plastic (GRP) pipes for water supply and sewerage.
	Miscellaneous Pipes	
48	IS 1545 : 1982	Soild drawn copper alloy tubes for condensers and heat exchanger (second revision)

S.No.	IS No.	Title
49	IS 404 : 1993	Lead Pipes
	Part 1 : 1993	For other than chemical purpose (second revision)
	Part 2 : 1979	For chemical purpose (second revision)
	IS 11906 : 1986	Recommendations for cement – mortar lining for cast iron, mild steel and ductile iron pipes and fittings for transportation of water.
C	Water Fittings	
	Taps	
1	IS 781 : 1984	Cast copper alloy screw drawn bid taps and stop valves for water services (third revision)
2	IS 1700 : 1973	Drinking foundations (first revision)
3	IS 1711 : 1984	Self – closing taps for water supply purpose (second revision)
4	IS 1795 : 1982	Pillar taps for use with fittings for water services (second revision)
5	IS 4346 : 1982	Washers for use with fittings for water services (first revision)
6	IS 8934 : 1978	Cast copper alloy fancy pillar taps for water services.
7	IS 9763 : 1981	Plastic bid taps and stop valves (rising spindle) for cold water services.
	Water Meters	
8	IS 779 : 1978	Water meters (domestic type) (fifth revision)
9	IS 2104 : 1981	Water meter boxes (domestic type) (first revision)
10	IS 2373 : 1981	Water meter (bulk type) (third revision)
11	IS 2401 : 1973	Code of practice for selection, installation and maintenance of domestic water meters (first revision)
12	IS 6784 : 1984	Method for performance testing of water meters (domestic type) (first revision)
	Valves	
13	IS 780 : 1984	Sluice valves for water works purpose (50 to 300 mm size) (sixth revision)
14	IS 2906 : 1984	Sluice valves for water works purpose (350 to 1200 mm size) (third revision)

S.No.	IS No.	Title
15	IS 2685 : 1971	Code of practice for selection, installation and maintenance of sluice valves (first revision)
16	IS 3042 : 1965	Single faced sluice gates (200 to 1200 mm size)
17	IS 3950 : 1979	Surface boxes for sluice valves (first revision)
18	IS 778 : 1984	Copper alloy gate, globe and check valves for water works purpose (fourth revision)
19	IS 1701 : 1960	Mixing valves for ablutionary and domestic purpose
20	IS 1703 : 1977	Ball valves (horizontal plunger type) including floats for water supply purpose (second revision)
21	IS 4838 : 1986	Foot valves for water works purposes (second revision)
22	IS 5312 : 1984	Single door pattern (first revision)
	Part 1 : 1984	Single door pattern (first revision)
	Part 2 : 1986	Multi door pattern
23	IS 9338 : 1984	Cast iron screw down stop valves and stop and check valves for water works purpose (first revision)
24	IS 9739 : 1981	Pressure reducing valves for domestic water supply systems.
25	IS 12234 : 1988	Equilibrium plastic float valve for cold water services.
	Miscellaneous Fittings	
26	IS 2692 : 1978	Ferrules for water services (first revision)
27	IS 3004 : 1979	Plug cocks for water supply purpose (first revision)
28	IS 9762 : 1981	Polyethylene floats for ball valves
29	IS 10446 : 1983	Glossary of terms relating to water supply and sanitation
D	Tubewells Pumps and Prime Movers Glossary	
1	IS 9439 : 1980	Glossary of terms used in water well drilling technology
2	IS 2800 : 1979	Code of practice for construction and testing of tubewells
	Part 1 : 1991	Construction (first revision)
	Part : 1979	Testing (first revision)
3	IS 11189 : 1985	Methods for tube-well development
4	IS 11632 : 1986	Code of practice for rehabilitation of tubewell

S.No.	IS No.	Title
	Tubewell Components	
5	IS 4097 : 1967	Gravel for use as pack in tubewells
6	IS 4270 ; 1983	Steel tubes used for water wells (first revision)
7	IS 8110 : 1983	Well screens and slotted pipes (first revision)
	Drilling Equipments, Accessories and Methods	
8	IS 7156 : 1974	General requirements for reverse circulation drilling rigs
9	IS 7206 : 1974	General requirements for straight rotary drilling rigs
10	IS 7209 : 1974	General requirements for blast hold drilling rigs
11	IS 8986 : 1978	Dimensions for drill steel in bar form for percussive drilling
12	IS 9026 : 1978	Rope threaded percussive long hole drilling equipment
13	IS 11180 : 1985	Keeleys for direct rotary drilling
14	IS 11312 : 1986	External upset drill pipe assemblies for use in water well drilling
	Part 1 : 1986	Screwed on joints drill pipe size
15	IS 11672 : 1986	Tungsten carbide buttons and inserts of use in down the hole (DTH) bits
16	IS 11830 : 1986	Code of practice for selection and design of diamond core drills
17	IS 11830 : 1986	General requirements for down the hole hammer rigs for water wells
18	IS 12097 : 1987	Classification and selection of drilling rigs for water well drilling
19	IS 12194 : 1987	Dimensions for rock roller bits and blade drag bits for rock drilling equipment
	Pumps and Related Standards	
20	IS 8035 : 1976	Shallow well hand pumps
21	IS 9301 : 1984	Deep well hand pumps (second revision)
22	IS 11004 : 1985	Code of practice for installation and maintenance of deep well hand pumps
	Part 1	Installation
	Part 2	Maintenance

S.No.	IS No.	Title
	Other Pumps	
23	IS 1520 : 1980	Horizontal centrifugal pumps for clear, cold, fresh water (second revision)
24	IS 1710 : 1972	Vertical turbine pumps for clear, cold, fresh water (first revision)
25	IS 6595 : 1980	Horizontal centrifugal pumps for clear, cold, fresh water for centrifugal purposes (first revision)
26	IS 8034 : 1976	Submersible pump sets for clear, cold, fresh water
27	IS 8418 : 1977	Horizontal centrifugal self priming pumps
28	IS 8472 : 1977	Regenerative self priming pumps for clear, cold, fresh water
29	IS 9079 : 1979	Monoset pumps for clear, cold, fresh water for agricultural purposes
30	IS 9137 : 1978	Code for acceptance test for centrifugal mixed flow and axial pumps – Class C
31	IS 9542 : 1980	Horizontal centrifugal monoset pumps for cold, fresh water
32	IS 9694	Code of practice for selection, installation, operation and maintenance for horizontal centrifugal pumps for agricultural applications.
	Part 1 : 1980	Selection
	Part 2 : 1980	Installation
	Part 3 : 1980	Operation
	Part 4 : 1980	Maintenance
33	IS 10572 : 1983	Methods of sampling pumps
34	IS 10804 : 1986	Recommendation pumping systems for agricultural purposes (first revision)
35	IS 10805 : 1986	Foot valves, reflux valves or non return valves and bore valves to be used in suction lines of agricultural pumping systems (first revision)
36	IS 10981 : 1983	Code for acceptance test for centrifugal mixed flow and axial pumps – Class B
37	IS 11346 : 1985	Testing set up for agricultural pumps
38	IS 12225 : 1987	Technical requirements for jet, centrifugal pump combination
39	IS 5120 : 1977	Technical requirements for roto dynamic special purpose pumps
40	IS 12933-1 (2003), Part 1: requirements	Solar flat plate collector

S.No.	IS No.	Title
	IS 12933-2 (2003) Part 2: components	Solar flat plate collector
	IS 12933-5 (2003) Part 5: Methods	Solar flat plate collector
41	IS 12976 (1990)	Solar water heating systems - code of practice
42	IS 15450 (2004)	Polyethylene/ aluminium / polyethylene composite pressure pipes for hot and cold water supplies
43	IS 2062 (1992)	Mounting structure steel
44	IS 4759	Galvanization of mounting structure
45	IEC 61215	PV modules certificate
46	IEC 61730	Safety qualification testing for PV modules
47	IEC 61701	Salt mist corrosion testing for PV modules
		Three phase induction motors
48	Prime Movers	Code of practice for installation and maintenance of induction motors
49	IS 325 : 1978	Single phase small A.C. and universal electric motors
50	IS 900 : 1965	Guide for testing three phase induction motors
51	IS 996 : 1979	Three phase squirrel cage induction motors for centrifugal pumps for agricultural application
52	IS 4029 : 1967	Valves of performance characteristics for three phase induction motors
53	IS 7538 : 1975	Motors for submersible pump sets
54	IS 8789 : 1978	Performance requirement for constant speed compression ignition (diesel) engines for general purposes (up to 20 Kw)
55	IS 9283 : 1979	Performance requirements for constant speed compression ignition (diesel) engines for agricultural purposes (up to 20 Kw)
56	IS 10001 : 1981	Engine monoset pumps for clear, cold, fresh water for agricultural purposes
57	IS 11170 : 1985	Code of practice for installation, operation and maintenance of hydraulic rams
58	IS 11501 : 1986	
59	IS 10808 : 1984	Hydraulic rams
60	IS 10809 : 1984	

S.No.	IS No.	Title
E	Test code for hydraulic rams	
1		Potash ash (first revision)
2	Water Quality	Aluminium alum (first revision)
3	IS 258 : 1967	Aluminium sulphate
4	IS 259 : 1969	Aluminium ferric (third revision)
5	IS 260 : 1969	Liquid chlorine (second revision)
6	IS 299 : 1980	Bleaching powder, stable
7	IS 646 : 1986	Methods of sampling and microbiological examination of water (first revision)
8	IS 1065 : 1971	Methods of sampling and test (physical and chemical) for water and waste water
	IS 1622 : 1981	Sampling (first revision)
	IS 3025 : 1964	Precision and accuracy
	Part 1 : 1986	Colour (first revision)
	Part 2 : 1987	Odour (first revision)
	Part 3 : 1983	Odour threshold (first revision)
	Part 4 : 1983	Test threshold (first revision)
	Part 5 : 1983	Test rating (first revision)
	Part 6 : 1984	Temperature (first revision)
	Part 7 : 1984	Turbidity (first revision)
	Part 8 : 1984	pH value (first revision)
	Part 9 : 1984	Density (first revision)
	Part 10 : 1983	Saturation index (with respect to calcium carbonate) (first revision)
	Part 11 : 1983	Specific conductance (wheat – stone bridge conductance cell) (first revision)
	Part 12 : 1983	Total residue (total dissolved solids) (first revision)
	Part 13 : 1984	Filterable residue (total dissolved solids) (first revision)
	Part 14 : 1984	Non filterable residue (total dissolved solids) (first revision)
	Part 15 : 1984	Volatile and fixed residue (total filterable and non filterable) (first revision)
	Part 16 : 1984	Settable matter (first revision)
	Part 17 : 1984	Dispersion characteristics (flow patterns) (first revision)
	Part 18 : 1984	Total hardness (first revision)
	Part 19 : 1984	Acidity (first revision)
	Part 20 : 1983	Alkalinity (first revision)
	Part 21 : 1986	Sulphate
	Part 22 : 1986	Chlorine demand (first revision)
	Part 23 : 1986	Chlorine, residual (first revision)
	Part 24 : 1986	Cyanide (first revision)

S.No.	IS No.	Title
	Part 25 : 1986	Sulphate (first revision)
	Part 26 : 1986	Sulphate (first revision)
	Part 27 : 1986	Bromide
	Part 28 : 1986	Phosphorous
	Part 29 : 1988	Chloride
	Part 30 : 1988	Iodide
	Part 31 : 1988	Nitrogen
	Part 32 : 1988	Silica
	Part 33 : 1988	Ozone residual
	Part 34 : 1988	Arsenic
	Part 35 : 1988	Dissolved Oxygen
	Part 36 : 1988	Oil and Greece
	Part 37 : 1989	Calcium
	Part 38 : 1989	Cadmium
	Part 39 : 1991	Copper
	Part 40 : 1992	Phenols
	Part 41 : 1992	B.O.D.
	Part 42 : 1992	Sodium and Pottasium
	Part 43 : 1993	Magnesium
	Part 44 : 1993	Lead
	Part 45 : 1994	Mercury
	Part 46 : 1994	Chlorine tablets
	Part 47 : 1994	Drinking water standards
9	IS 9825 : 1981	
F	IS 10500 : 1991	
1		Glossary of terms and symbols used in connection with the measurement of liquid flow with a free surface (first revision)
2	Measurement Of Fluid Flow	Velocity area methods for measurement of flow of water in open channels
3	IS 1191 : 1971	Forms for recording measurement of flow of water in open channels
4	IS 1192 : 1981	Recommendations for liquid flow measurement in open channels by slope area method (approximate method) (Amendment No. 1)
5	IS 1194 : 1960	Recommendation for determination of flow in tidal channels
6	IS 2912 : 1964	Recommendation for estimation of discharge by establishing stage – discharge relation in open channels. (Amendment No.1)
7	IS 2913 : 1964	Instructions for collection of data for the determination, of the flow by velocity area methods
8	IS 2914 : 1964	Recommendation for estimation for flow of liquids in closed conduits

S.No.	IS No.	Title
8.1	IS 2915 : 1964	Head loss in straight pipes due to friction resistance
9	IS 2951 : 1965	Head loss in valves and fittings
	Part 1 : 1965	Recommendation for methods of measurement of liquid flow by means of orifice plates and nozzles
	Part 2 : 1965	Incompressible fluids
10	IS 2952 : 1964	Compressible fluids
	Part 1 : 1964	Specification for current meters (cup type) for water flow measurement (Amendment No.1)
11	Part 2 : 1975	Specification for surface floats
12	IS 3910 : 1966	Specification for sounding rods
13	IS 3911 : 1966	Code of practice for use of current meter (cup type) for water flow measurement
14	IS 3912 : 1966	Specification for fish weights
15	IS 3918 : 1966	Specification for vertical staff gauges
16	IS 4073 : 1967	Methods of measurement of fluid flow by means of venturi meters:
	IS 4080 : 1967	Liquids
	IS 4477	Compressible fluids
17	Part 1 : 1967	Specification for velocity rods
18	Part 2 : 1975	Recommendation for liquid flow measurement in open channels by wires and flumes – Weirs of finite crest width for free discharge
19	IS 4858 : 1968	Methods of measurement of flow of water in open channels using standing wave flume fall
20	IS 6059 : 1971	Methods of measurement of flow of water in open channel using standing wave flume
21	IS 6062 : 1971	Specification for sounding and suspension equipment
22	IS 6063 : 1971	Recommendation for liquid flow measurement in open channels by weirs and flumes – end depth method for estimation of flow in rectangular channels with a free overall (approximately method)
23	IS 6064 : 1971	Methods of analysis of concentration, particle size distribution and specific gravity of sediment in streams and canals
24	IS 6330 : 1971	Liquid flow measurement in open channels using this plate weirs

S.No.	IS No.	Title
25	IS 6339 : 1971	Method for estimation of incompressible fluid flow in closed conduits by bend meters
26	IS 9108 : 1979	Specification for water stage recorder (float type)
27	IS 9115 : 1979	Recommendation for liquid flow measurement in open channels by weirs and flumes – end depth method for estimation of flow in non Rectangular channels with a free over all (approximate method)
28	IS 9116 : 1979	Method for measurement of pressure by means of manometer
29	IS 9117 : 1979	Method for flow estimation by jet characteristics (approximate method)
30	IS 9118 : 1979	Dilution Methods for measurement of steady flow constant rate injection method
	IS 9119 : 1979	
31	IS 9163 : 1979	Guide for selection of method for measuring flow in open channels
	Part 1	
G		
1	IS 9922 : 1981	Treatment of water for low and medium pressure in land boilers
2	Treatment	Treatment of water for marine boilers
3	IS 1680 : 1982	Treatment of water for locomotive boilers
4	IS 1813 : 1961	Quality tolerances for swimming pool
5	IS 2859 : 1977	Treatment of water for high pressure boiler
6	IS 3328 : 1965	Guidelines for rapid mixing devices
7	IS 4343 : 1983	Guidelines for flocculator devices
8	IS 7090 : 1985	Requirement for rapid gravity filtration equipment
	IS 7208 : 1992	Filtration media – sand and gravel
	IS 8419 : 1984	Under drainage systems
9	Part 1 : 1984	Requirement for sludge dewatering equipment
	Part 2 : 1984	Sludge drying beds including sand, gravel, under drains
	IS 10037	Vacuum filtration equipment for dewatering sludge
	Part 1 : 1981	Centrifugal equipment (solid bowl type)
10	Part 2 : 1983	Requirements of settling tank (clarifier equipment) for waste water treatment plant

S.No.	IS No.	Title
11	Part 3 : 1983	Requirements of settling tank (clarifier equipment) for water treatment plant
12	IS 10261 : 1982	Requirements for chlorination equipment
	IS 10313 : 1982	General guidelines for chlorination plants including handling, storage and safety of chlorine cylinders and drums
	IS 10553	Vacuum feed type chlorinators
	Part 1 : 1983	Gravity feed type gaseous chlorinators
	Part 2 : 1983	Bleaching powder solution feeder displacement type chlorinator
13	Part 4 : 1983	Water for drinking purposes, guide for defluoridation (chemical treatment method)
14	Part 5 : 1987	Code of practice for general construction in steel
15	IS 12742 : 1989	ISI Hand Book for structural engineers Structural steel sech
16	IS 800 : 1984	Steel Beams & Plate girders
17	SP 6 (1) : 1964	Steel Columns & Struts
18	SP 6 (2) : 1962	Application of plastic theory in design of steel structures
19	SP 6 (3) : 1962	Simple welded girders
20	SP 6 (6) : 1972	Design and Construction of foundations general requirements (3rd revision)
21	SP (7) : 1972	Glossary of terms and symbols relating to soil engineering
22	IS 1904 : 1985	Safety code for excavation work
23	IS 2809 : 1972	Structural safety of Building Masonry walls (2nd revision)
24	IS 3764 : 1966	Rubble stone masonry
25	IS 1905 : 1980	Ashlars masonry
26	IS 1597 : Part – 1	Brick Work
27	IS 1967 : Part – 2	Preparation and use of lime concrete
28	IS 2212 : 1962	Preparation and use of lime pozzolana mixture concrete in buildings and roads
29	IS 2541 : 1977	Rapid hardening Portland cement
30	IS 5817 : 1970	Hydro pholic cement
31	IS 8041	Low heat Portland cement
32	IS 8043	Sulphate resisting Portland cement
33	IS 12600	Super sulphate cement
34	IS 12330	High alumina cement
35	IS 6909	Portland slag cement
36	IS 6542	Fly ash Grade – 1
37	IS 455 : 1989	Ground generated Blast slag cement GGBS

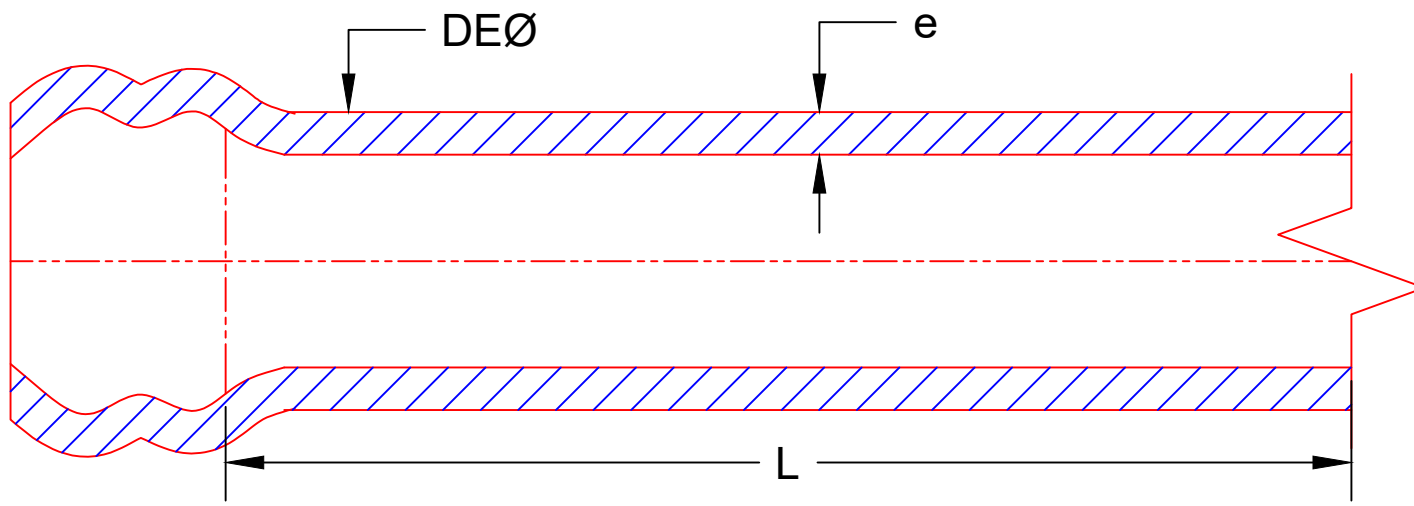
S.No.	IS No.	Title
	IS 3812	
	IS 12089	
	Material Testing	
1	IS 13311 : Part – 1	Ultra sonic pulse velocity test (non destructive testing of concrete)
2	IS 13311 : Part – 2	Rebound Hammer Test
3	IS 10262 : 2009	Guide lines for concrete mix proportioning (draft)
4	IS 2386 : 1963	Methods of tests for aggregate for concrete
5	IS 383 :1970	Specifications for coarse and fine aggregates from Natural Sources for Concrete
6	IS 9103 : 1999	Specifications for admixtures for concrete
7	IS 1199 : 1959	Methods of sampling and analysis of concrete
8	IS 516 : 1959	Methods of tests for strength of concrete
9	IS 10262	Mix proportioning of plain and rice husk ash concrete (draft)
10	SP – 23 : 1982	Hand Book on Concrete Mix Design
11	IS 4031 : Part – 5	Test Blocks for initial setting time test OPC
	Steel – Reinforcement Bars	
1	IS 432 : Part – 1	Mild steel and medium tensile steel
2	IS 1786	High strength deformed steel bars (HYSD)
3	IS 4948 : 2002	Hand drawn steel wire fabric
4		Structural steel centrifugal to Grade A
5	IS 456 : 2000	Code of practice for plain and reinforced concrete
6	IS 1893 : 2002	Criteria for Earthquake Resistant Design of Structure
		General Provisions & Buildings
	IS 3370	Liquid Retaining Tanks, Elevated & Ground Reservoirs
7	IS 875	
		Code of practice for design loads (Other than earthquake) for Buildings & Structures Wind Loads
8	IS 875	
	Part – 3 (Draft)	Code of practice for design loads (Other than earthquake) for Buildings & Structures Wind Loads
9	IS 875 : 1987	Code of practice for Ductile detailing of reinforced concrete structures subjected to seismic forces.

S.No.	IS No.	Title
10	Part – 5	Code of practice for concrete structure for the storage of liquids.
	IS 13920 : 1993	
	IS 3370 : 1965	
11	Part – 1 & 2	Criteria for RCC Staging for Overhead Water Tanks
12	Part – 3 & 4 : 1967	Code of practice for Design & Construction of Ring Foundation
13	IS 11682 : 1985	Code of practice for Design & Construction of Shallow Foundation in Soil
14	IS 11089 : 1984	Code of practice for Design & Construction of pile foundation
15	IS 1080 : 1985	Specification for High Strength Deformed Bars & Wires for Concrete Reinforcement
16	IS 2911 : 1988	Specification for Hot rolled Mild Steel Medium Steels & High Strength Deformed bars for Concrete Reinforcement
	IS 1786 : 1985	
	IS 1139 : 1966	

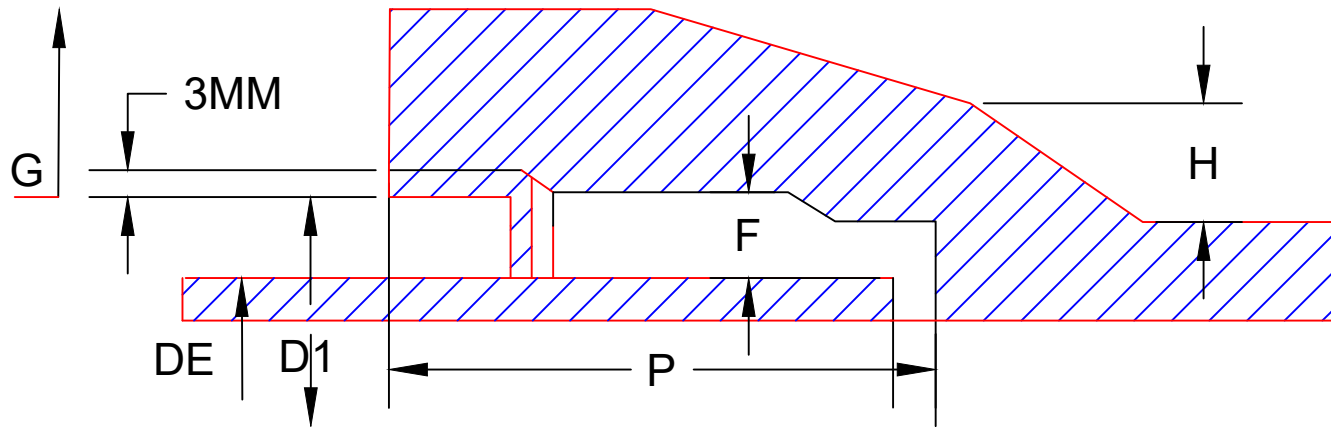
Drawings for Water Supply & Sewerage.

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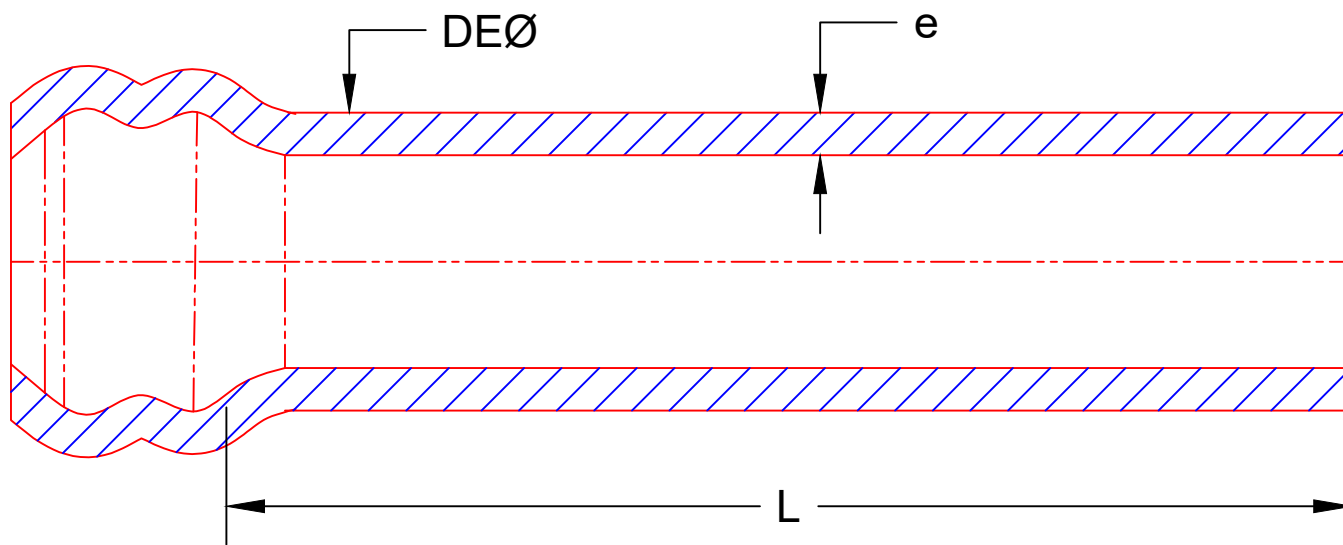
PIPES



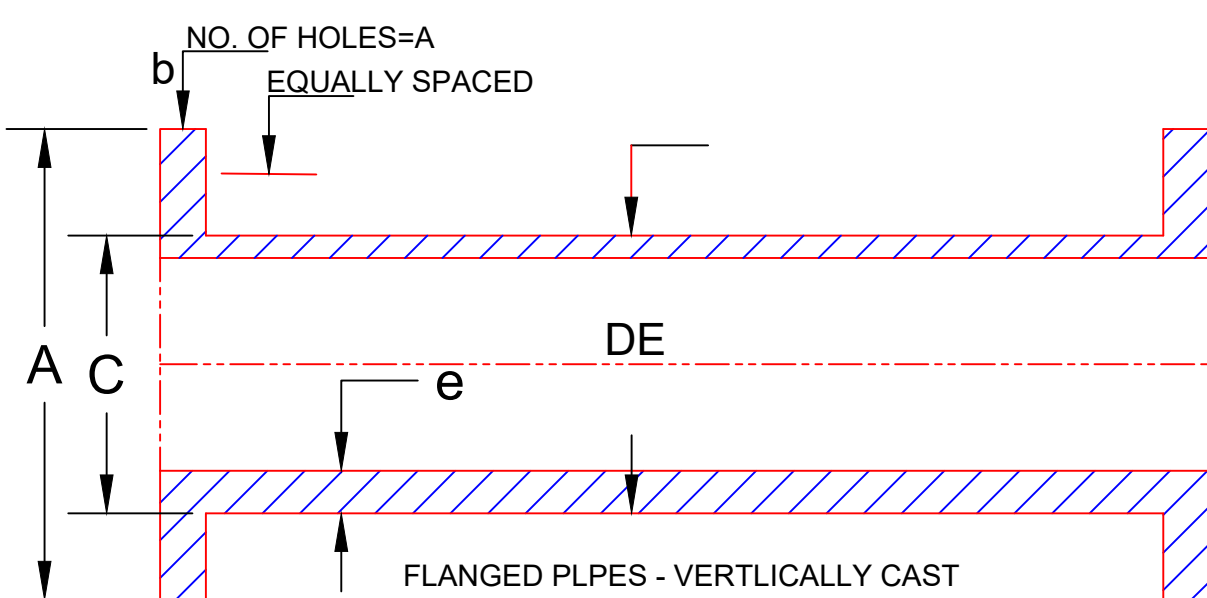
CANTRIFUGALLY CAST SOCKET & SPIGOT PIPE



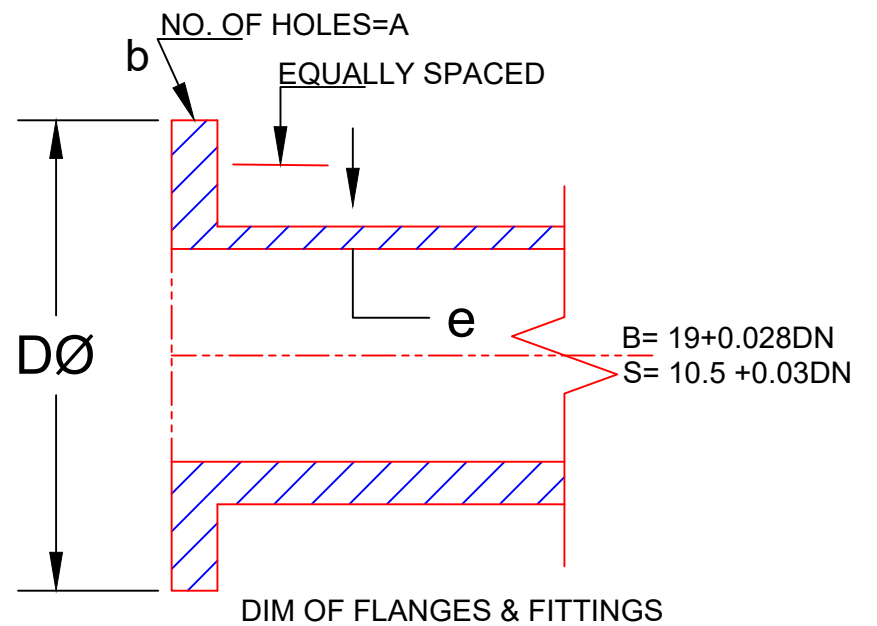
DIMENSION OF SOCKET AND SPIGOT PIPES (IS-1536)



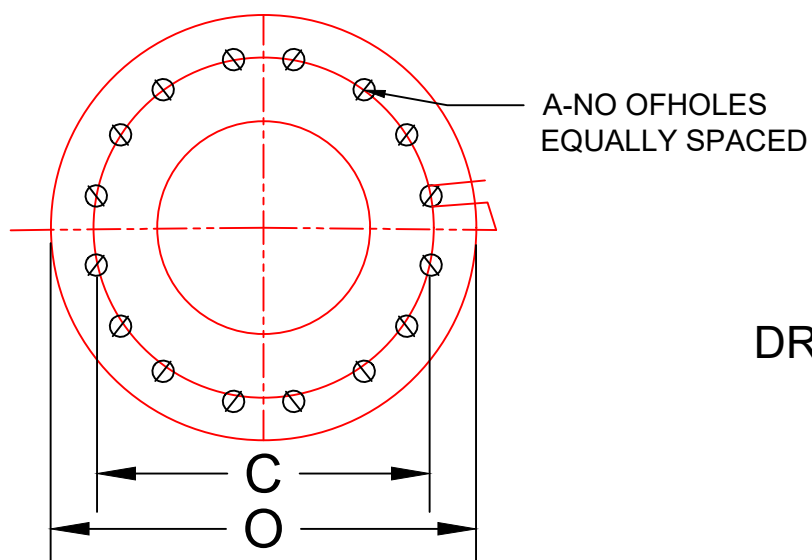
SOCKET & SPIGOT VERTICAL CAST PIPE



FLANGED PLPES - VERTLICALLY CAST

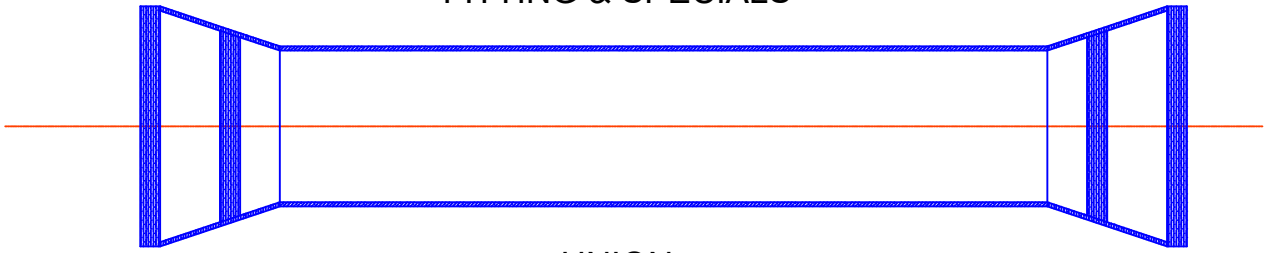


DIM OF FLANGES & FITTINGS

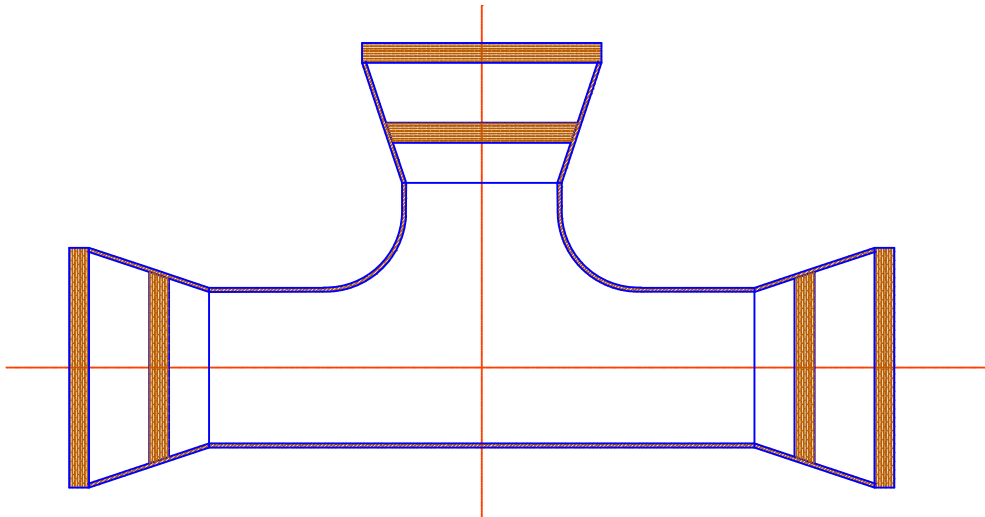


DRAWING NO.1

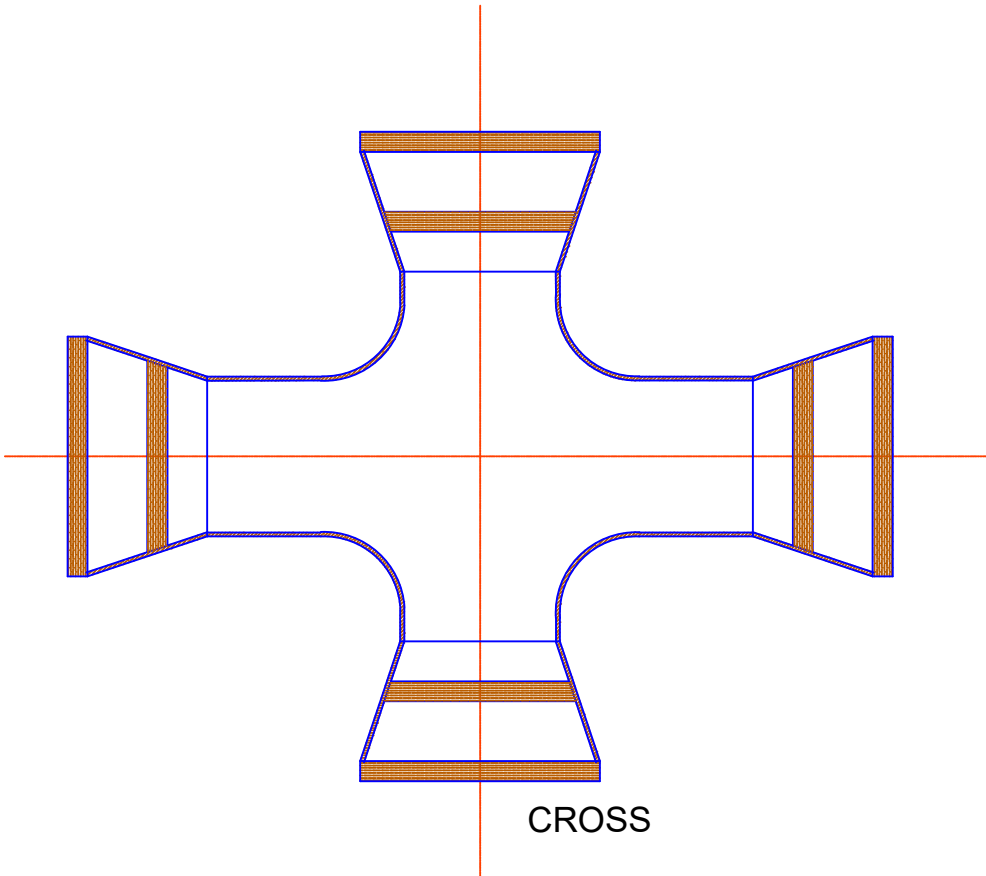
FITTING & SPECIALS



UNION



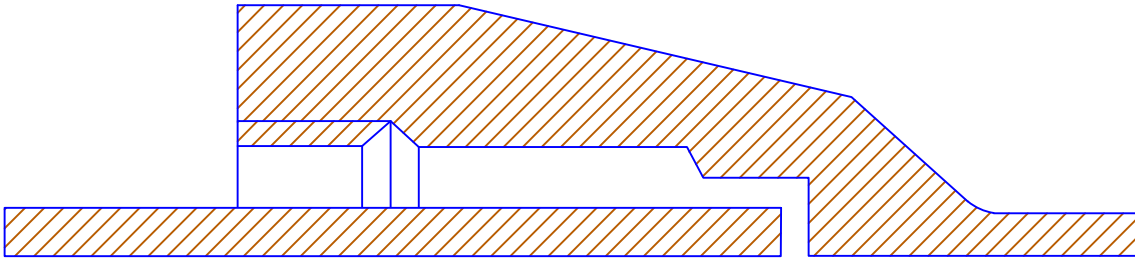
BRANCH T



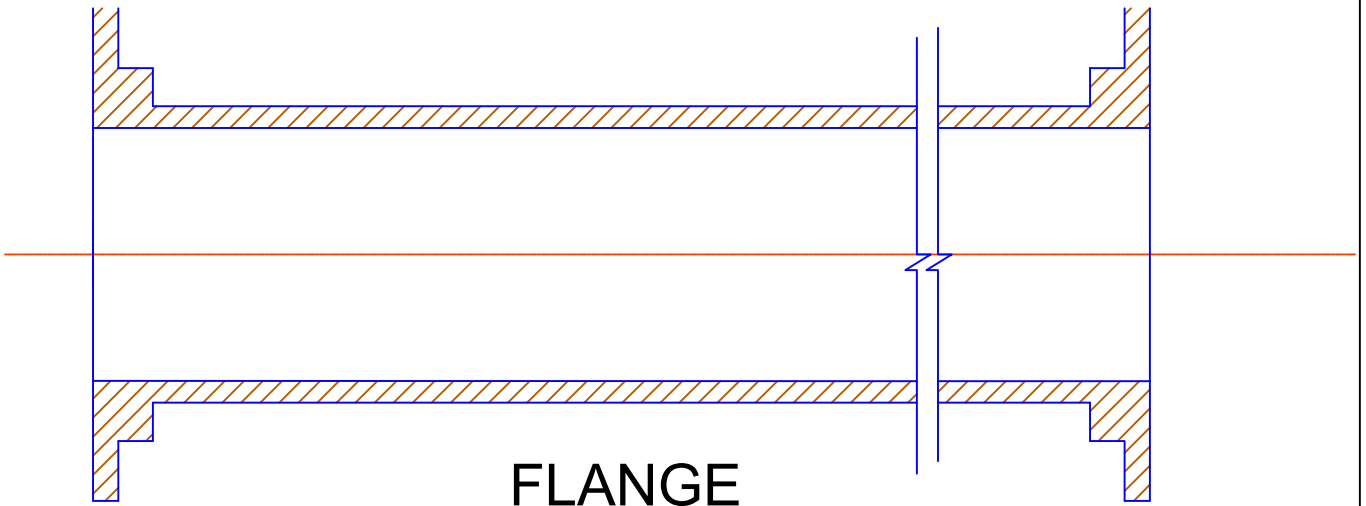
CROSS

DRAWING NO. 2A

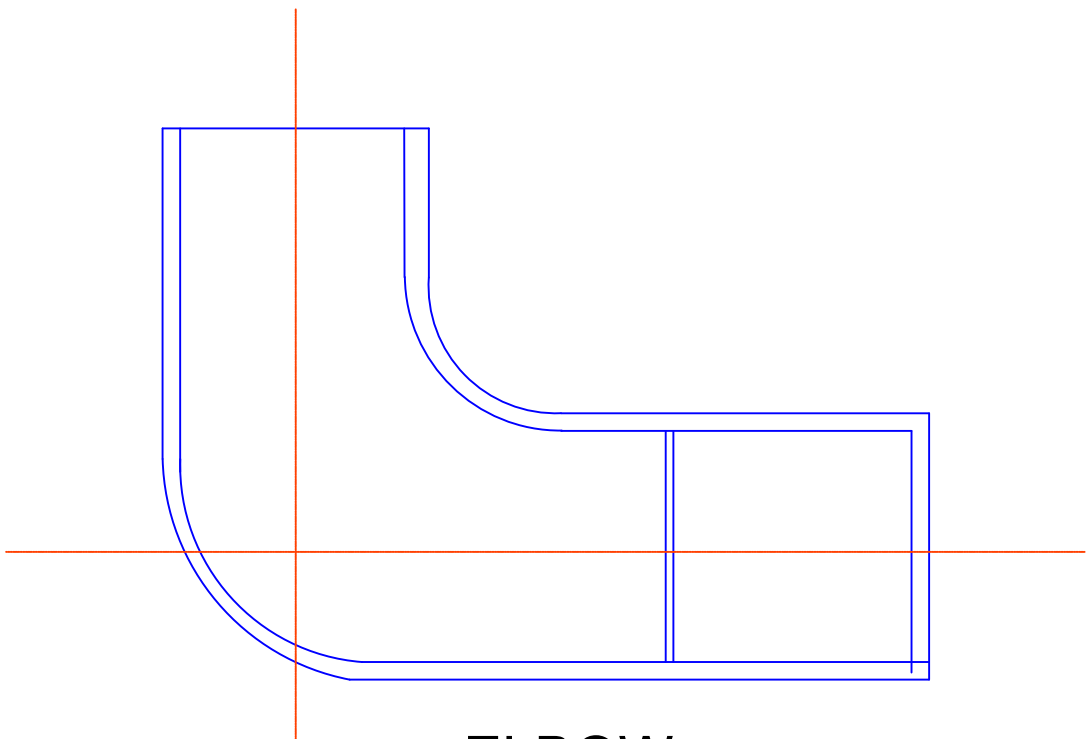
FITTING & SPECIALS



SOCKET / SPIGOT



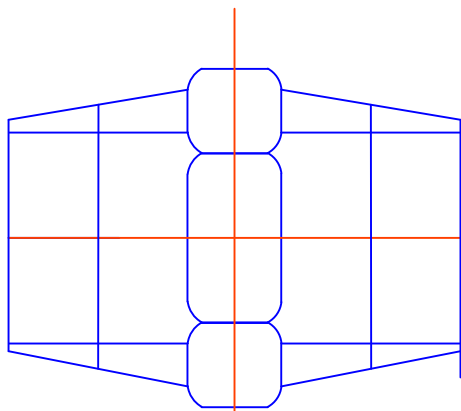
FLANGE



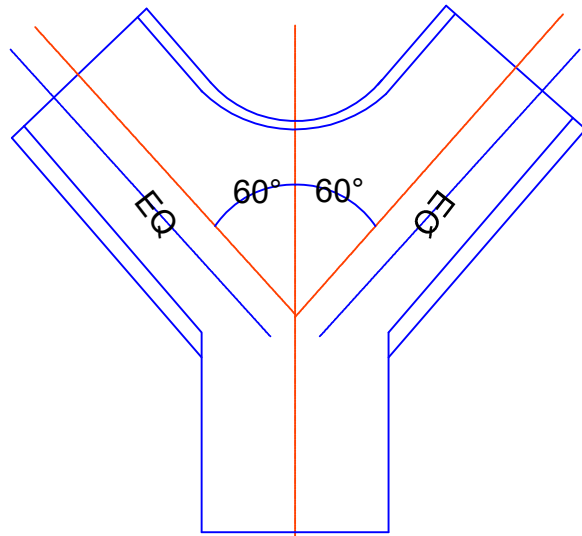
ELBOW

DRAWING NO. 2B

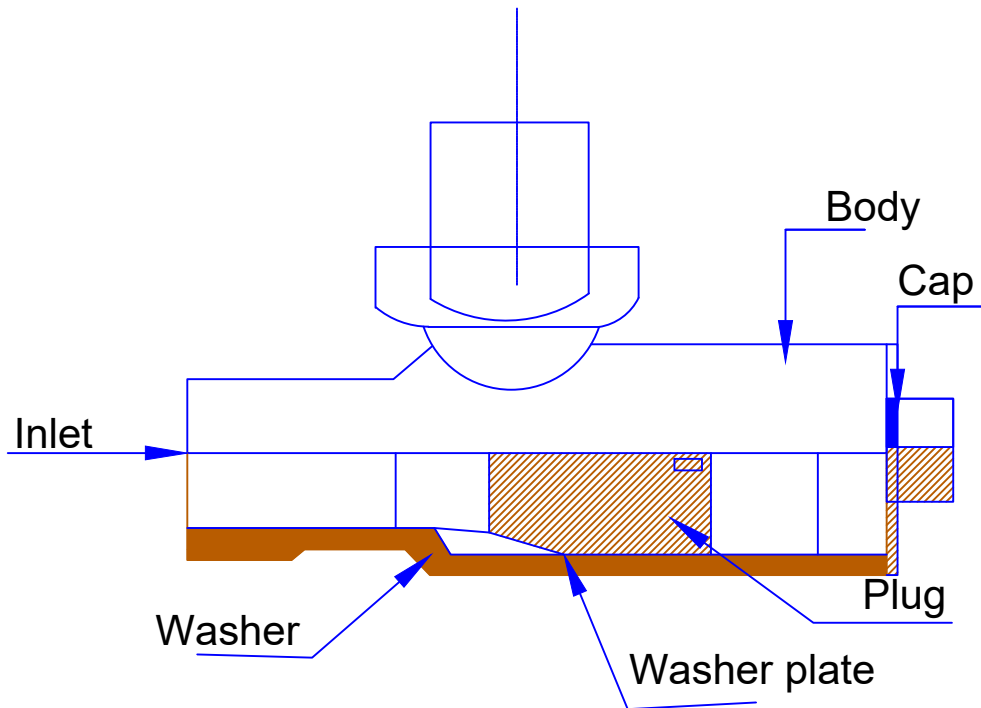
FITTING & SPECIALS



NIPPLE



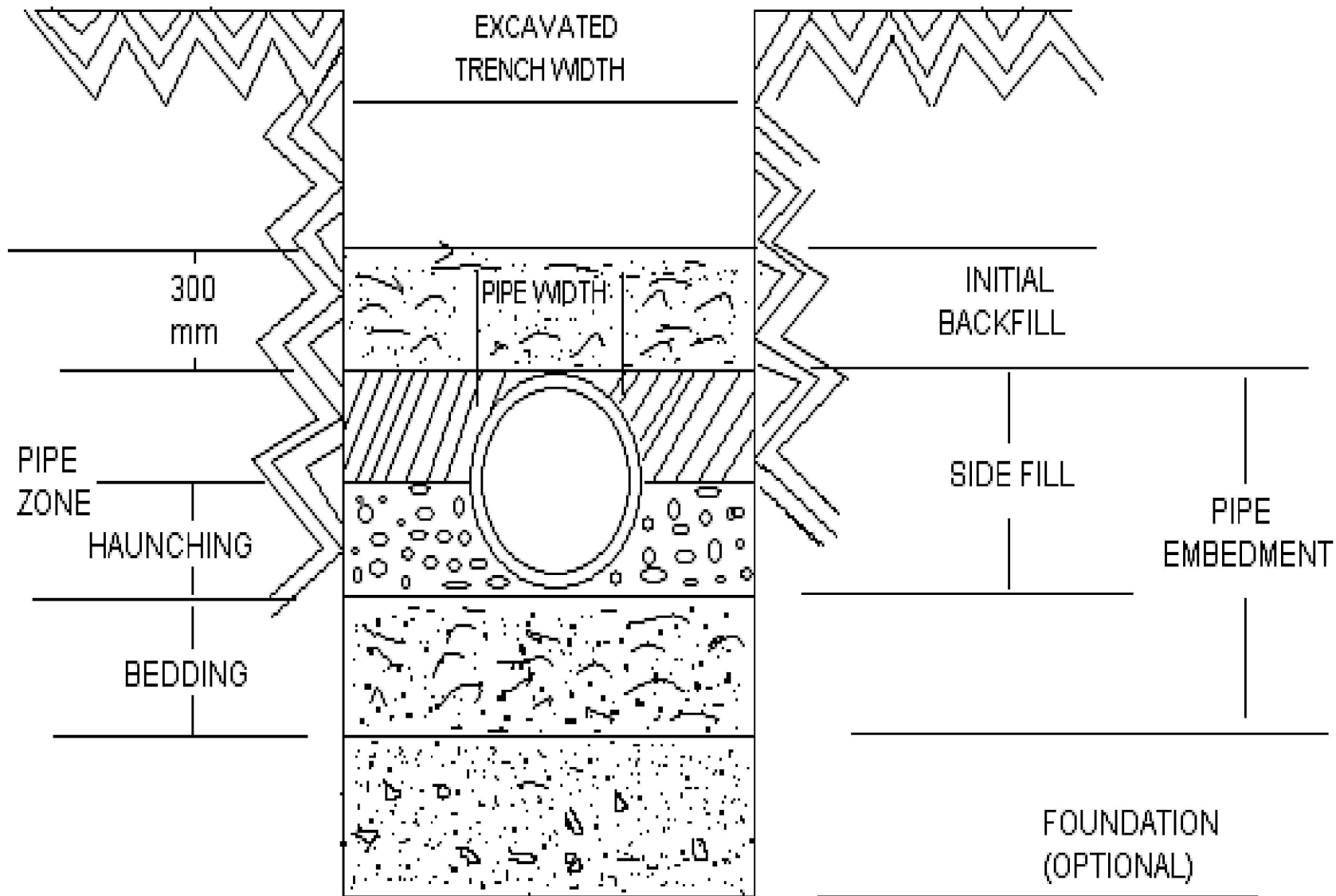
BRANCH "Y"



Fittings &Specials

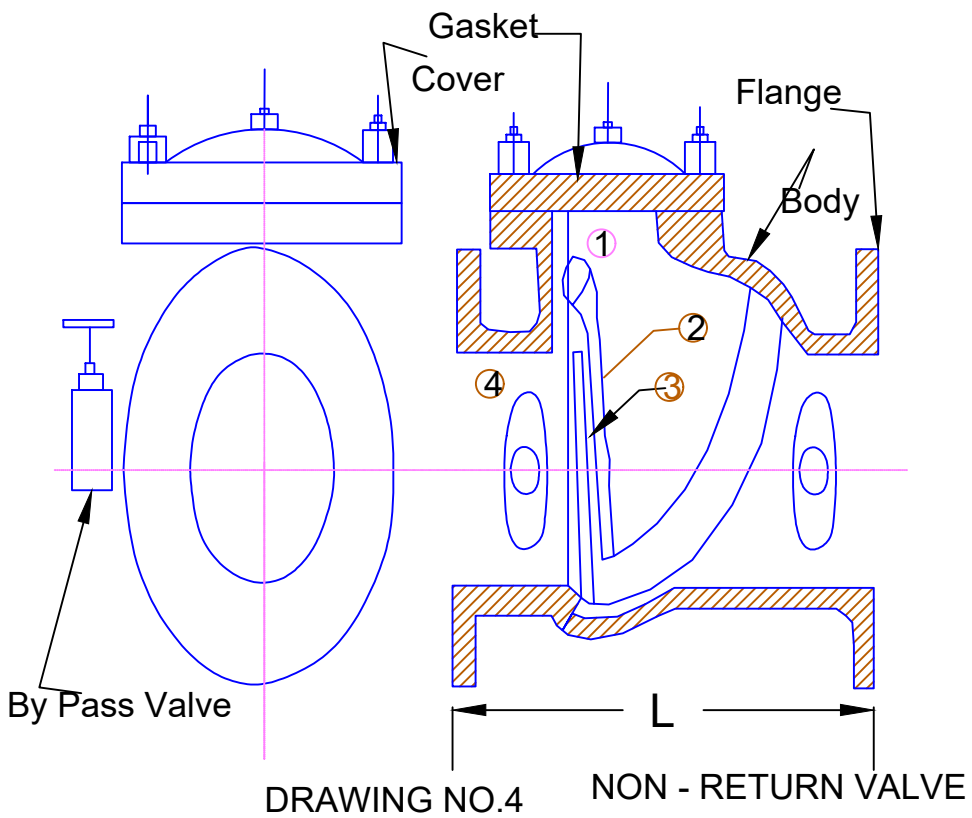
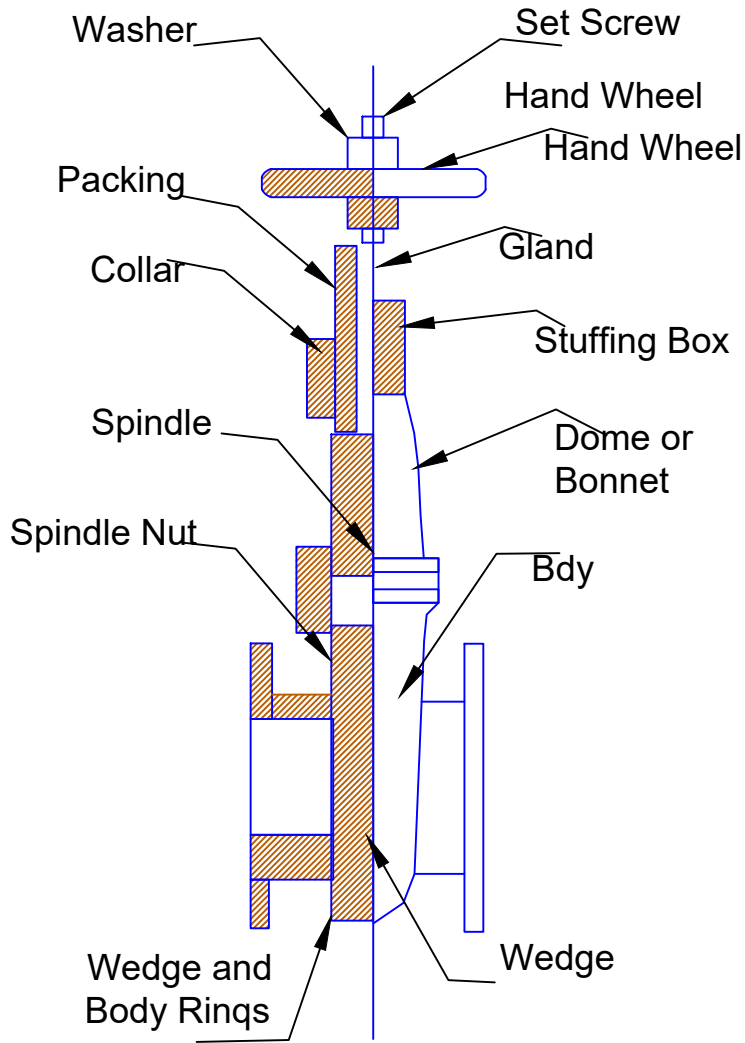
DRAWING NO. 2C

Terminology of Trench Cross-Sections for UPVC & PVC - U Pipes

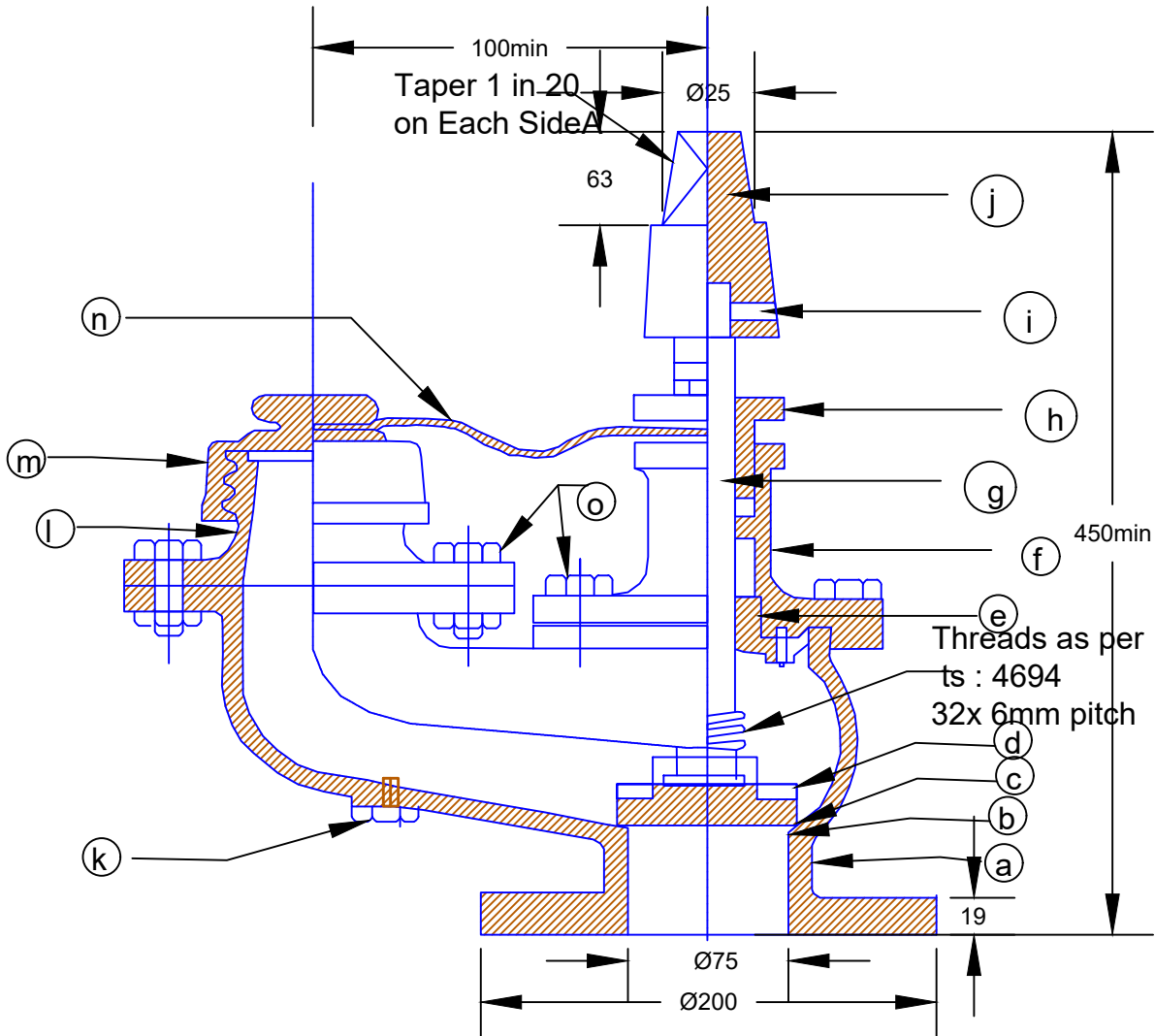


DRAWING NO.3

SLUICE VALVE & NON RETURN VALVE

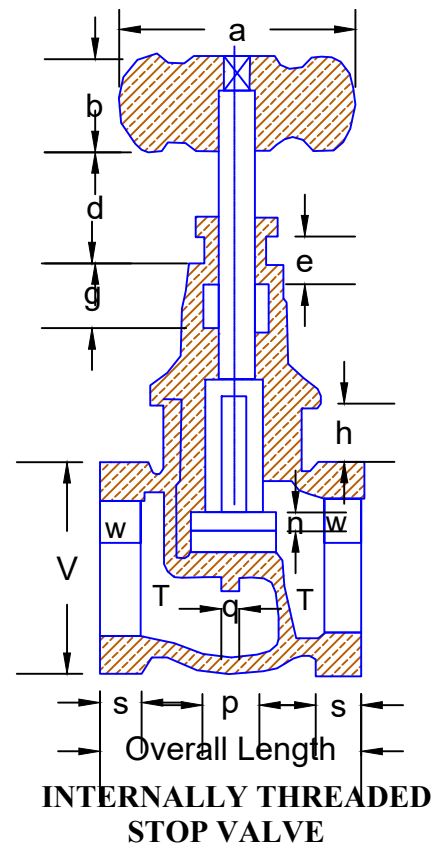
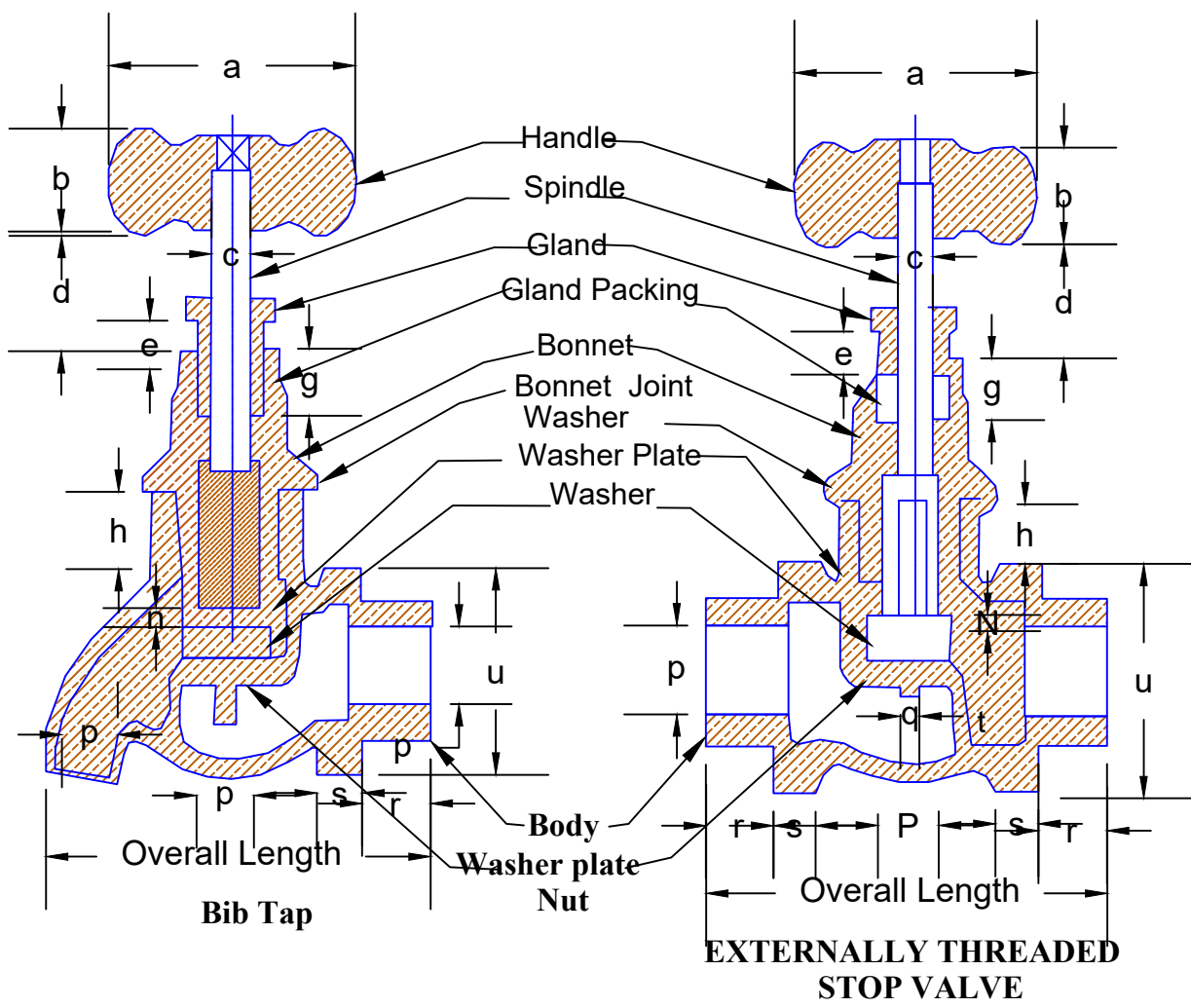


SLUICE VALVE GATE, UNDER GROUND FIRE HYDRANT



NO.	DESCRIPTION	MAT	MAT SPECIFICATION
a	body	c.l.	is 210-1972fg -200
b	valve seat	g.m.	is 318-1981ltb-2
c	washer	rubber	is 937-1981
d	valve	g.m.	is318- 1981 ltb - 2
e	spindle nut	g.m.	is 318 -1981 ltb -2
f	bonnet	c.l.	is 210 - 1978fg -200
g	spindle	brass	is 319 - 1989
h	gland	c.l.	is 210 - 1978 -fg 200
i	grush screw (12mm)	m.s.	is 6094 - 1981
j	splndl cap	c.l.	is 210 -1978 fg 200
k	drain bolt	m.l.	-
l	outlet	g.m.	is 318 - 1981 ltb -2
m	cap	c.l.	is 210 - 1978 fg - 200
n	chain	gat.ms	-
o	nut and bolt	m.s.	-

DRAWING NO. 5



DRAWING NO. 6A

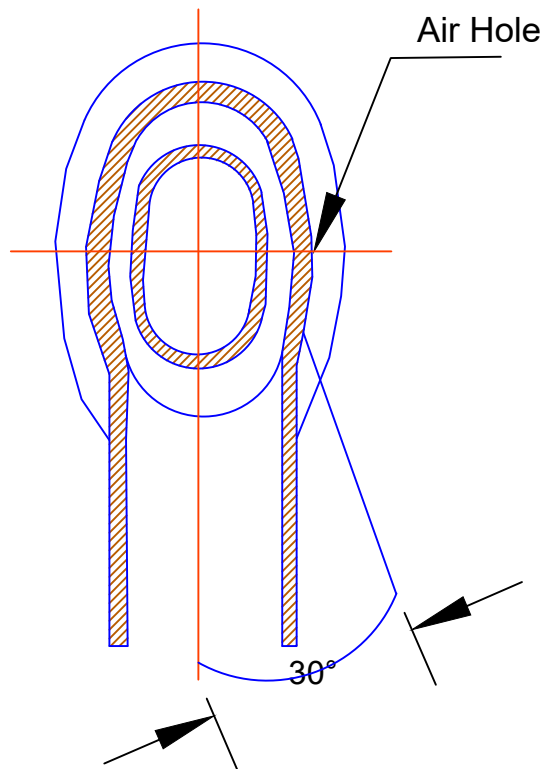
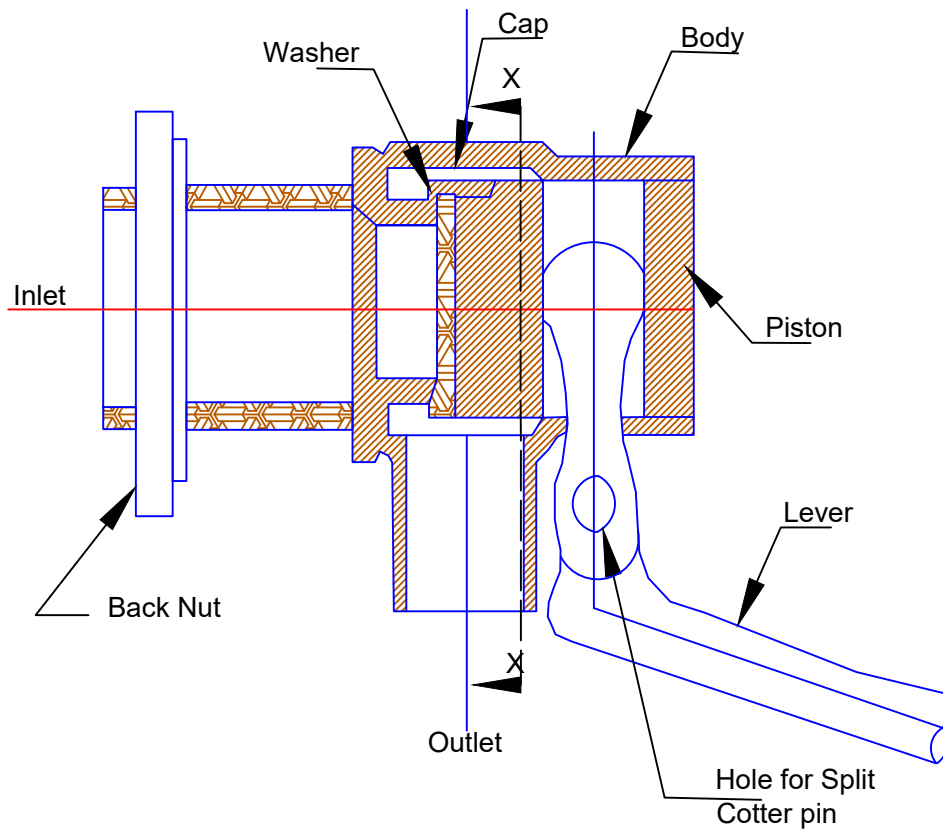
ALL DIMENSIONS IN MILLIMETRES

Nominal sizes	Dimensions																				Lift of washer plate (with Washer in position min.)	
	a	b	c	d	e	f	g	h	i	k	l	m	n	p	q	r	s	t	u	v		w
8	47.8	13.3	7.8	16.5	6.3	2.0	7.9	7.0	3.8	10.0	m20x1.5	14.3	2.8	6.5	2.4	11.0	4.7	1.6	15.2	19.5	7	3.5
10	54.0	14.0	9.4	18.7	7.5	2.0	9.5	9.5	4.7	11.5	m20x1.5	15.9	3.2	9.0	3.2	11.4	7.9	2.0	20.8	23.3	7	4
15	54.0	14.0	9.4	19.0	7.5	2.0	9.5	11.0	5.6	11.5	m24x1.5	19.0	3.2	13.0	4.1	15.0	9.5	2.0	25.6	28.3	9	4.6
20	60.4	15.7	10.9	20.1	8.9	2.5	11.1	12.5	6.4	13.5	m30x1.5	25.4	4.0	18.0	4.9	16.3	10.3	2.0	30.5	33.0	10.5	6
25	66.8	18.0	12.5	23.0	10.1	2.5	12.7	13.0	7.1	17.0	m39x1.5	33.3	4.0	23.0	4.9	19.1	11.0	2.8	37.6	42.4	11.5	7
32	74.6	20.5	14.1	30.9	11.4	2.5	14.3	16.0	7.8	19.0	m48x1.5	40.1	4.3	30	5.9	21.4	12.7	32	47.2	52.1	13.5	9.5
40	82.5	22.0	15.7	33.3	12.7	2.5	15.9	17.5	8.6	20.5	m56x1.5	47.7	5.5	36	6.6	21.4	14.3	3.2	56.4	58.5	13.5	11
50	95.0	25.3	17.3	35.9	14.0	2.5	17.4	17.5	12.5	26.0	m72x1.5	63.5	6.3	46	8.3	25.1	15.9	4.0	70.1	71.5	16.5	<u>14.5</u>

**X means :Lift of washer plate
(with Washer in position min.)**

DRAWING NO. 6B

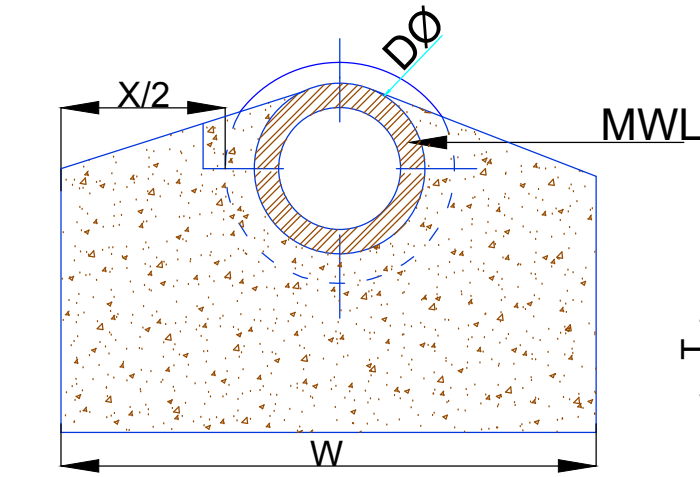
BALL VALVES



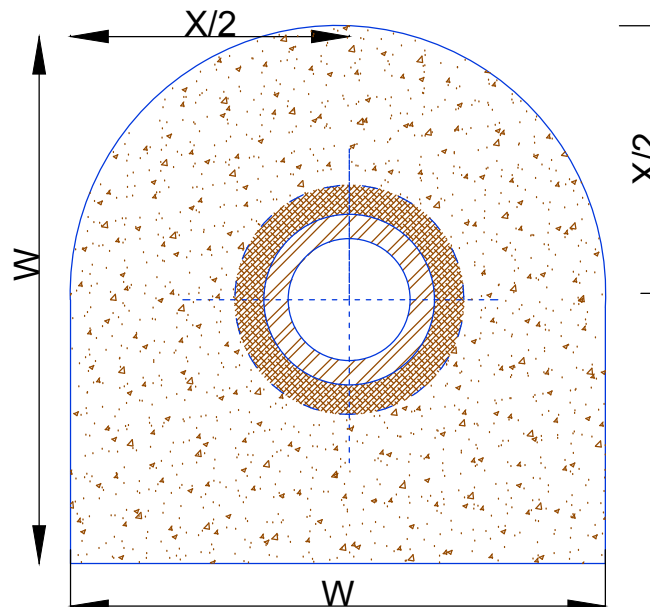
SECTION XX

DRAWING NO. 7

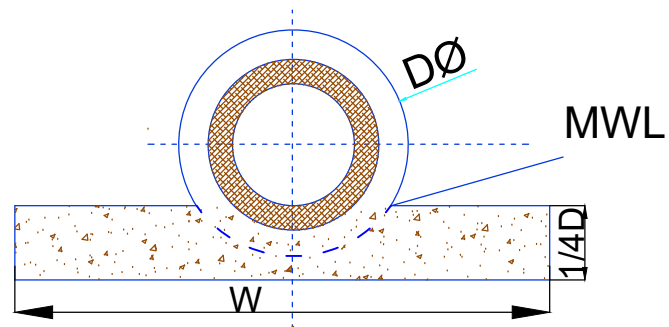
BEDDING/ENCASING IN STONEWARE PIPES



(1) CONCRETE UPTO HAUNCHES



(2) CONCRETE ALL ROUND



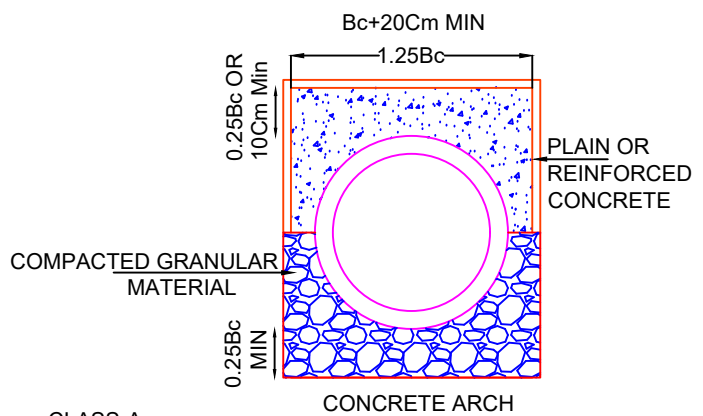
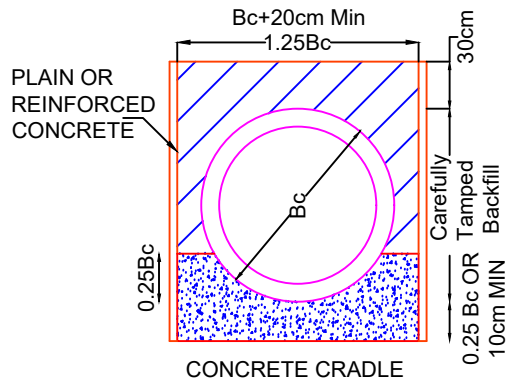
(3) CONCRETE BEDDING

h = helgth of fill above top of pipe in metres

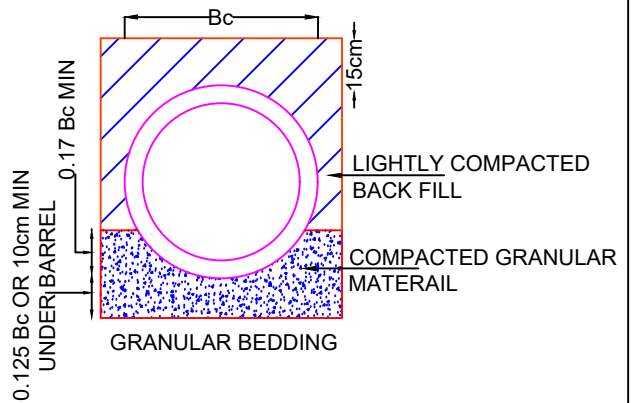
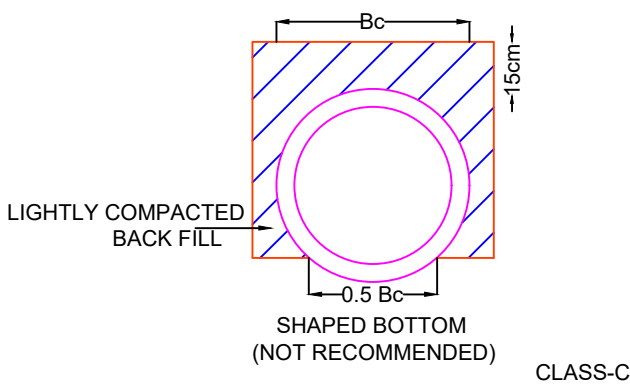
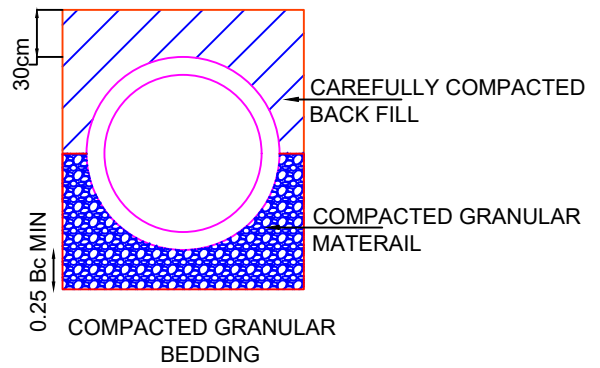
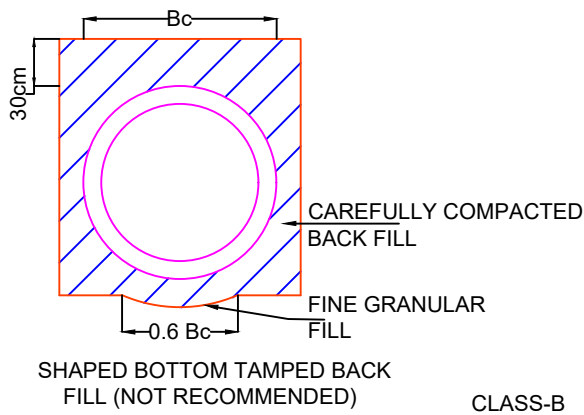
x = min 200 for ' h ' < 5000 when ' h ' > 5000.10 for every 250 of ' h '

DRAWING NO.8

CLASSES OF BEDDING FOR CONDUIT IN TRENCH



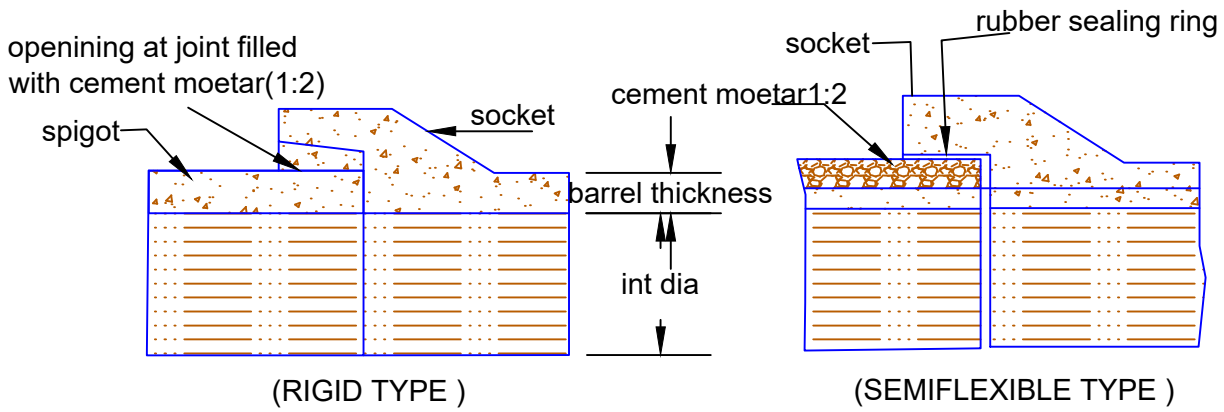
CLASS-A



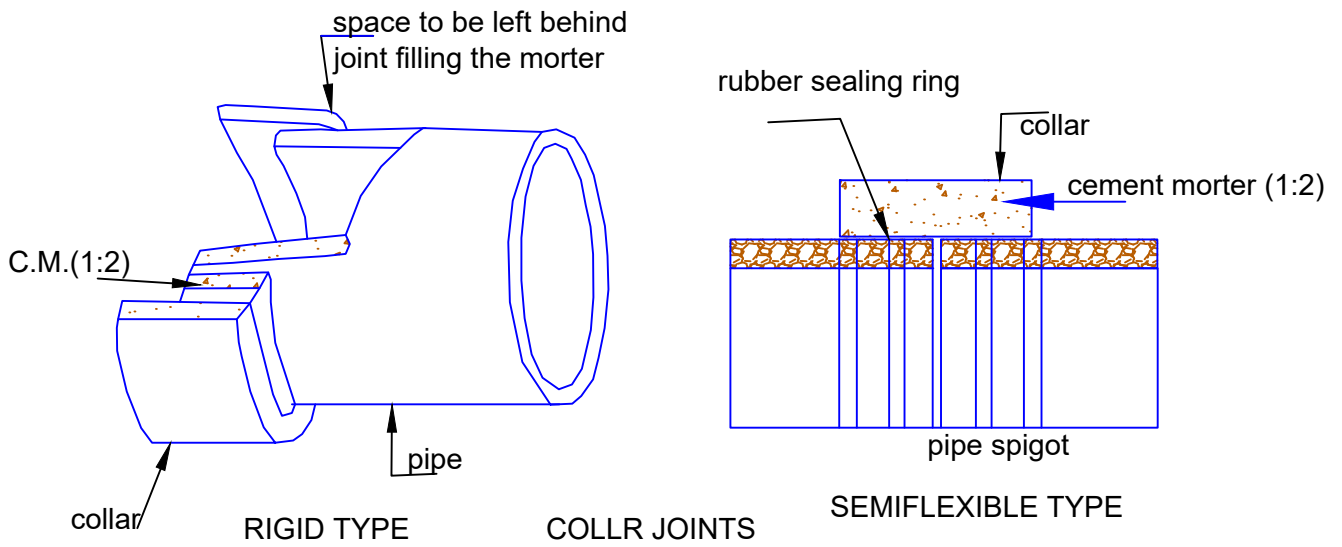
NOTE:

- 1- IN ROCK TRENCH IS EXCAVATED AT LEAST 15cm BELOW THE BELL OF THE PIPE EXCEPT WHERE CONCRETE CRADLE IS USED
- 2- Bc = EXTERNAL DIAMETER OF PIPE

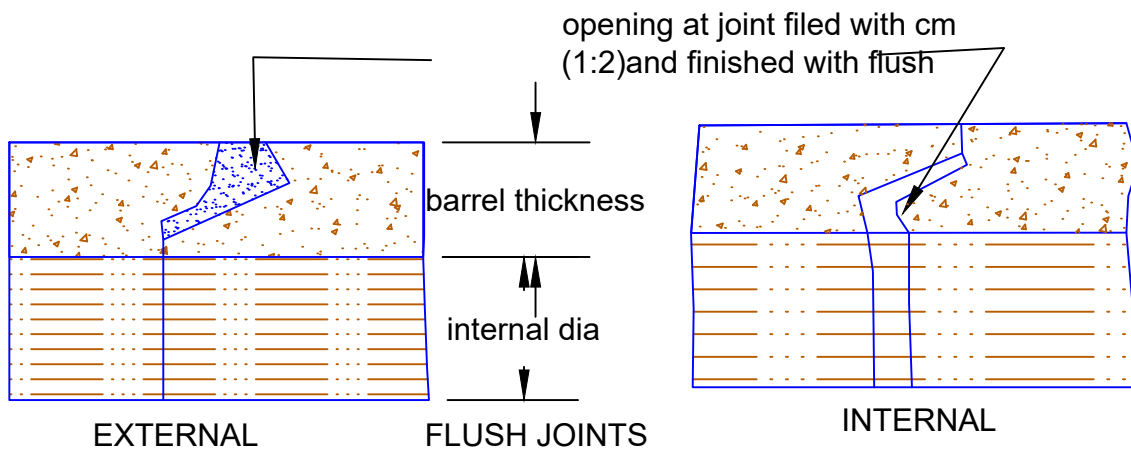
JOINTS OF CONCRETE PIPES



SPIGOT & SOCKET JOINTS



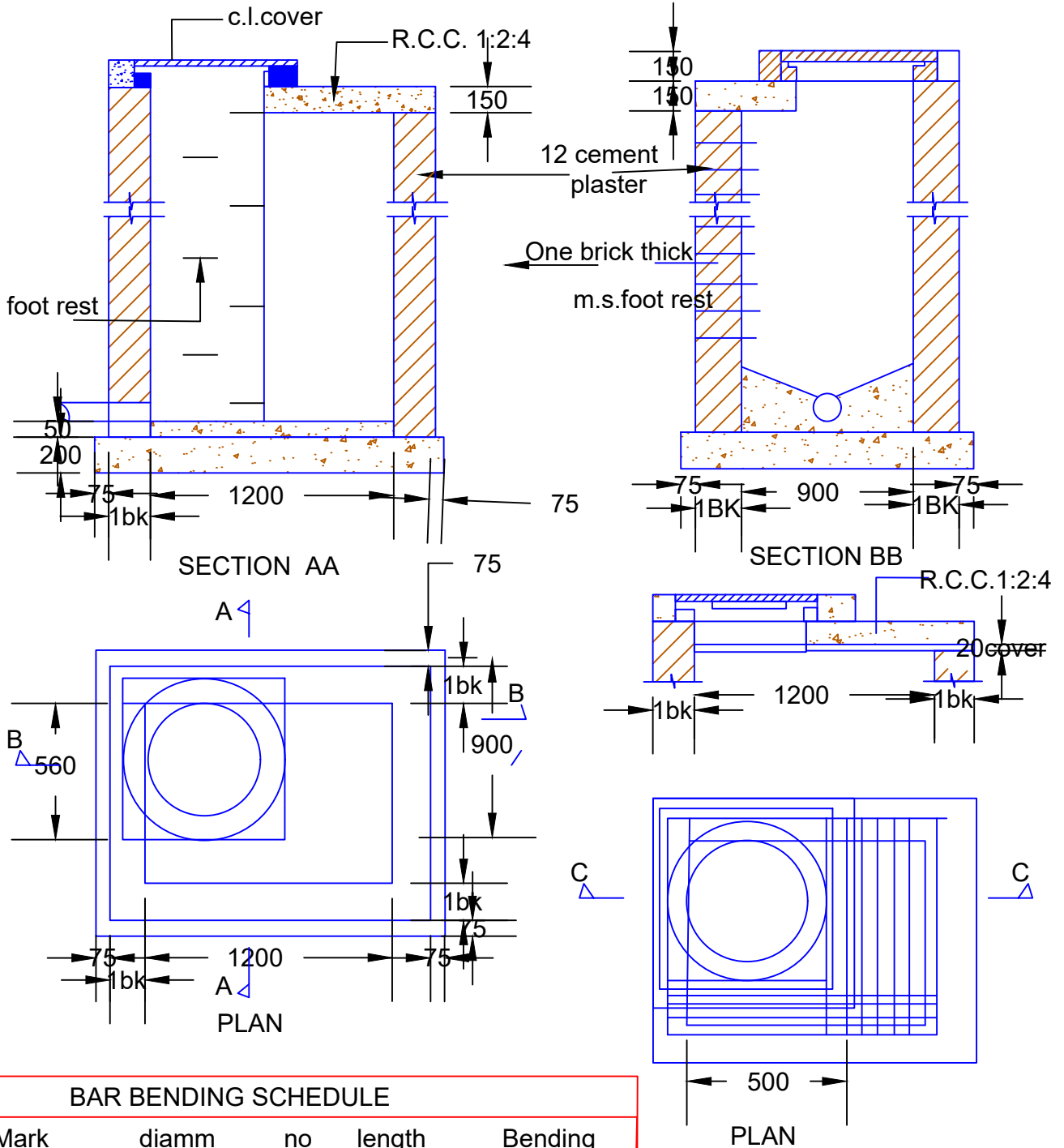
COLLAR JOINTS



EXTERNAL FLUSH JOINTS INTERNAL

DRAWING NO.10

SIZE 1200X 900 RECTANGULAR MANHOLE

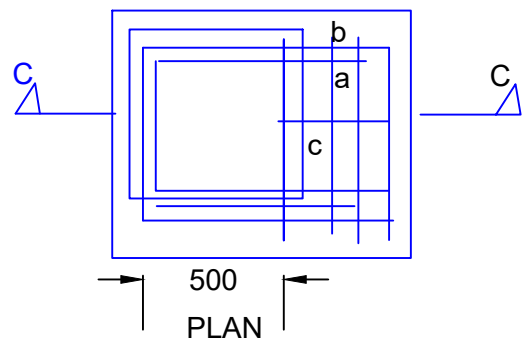
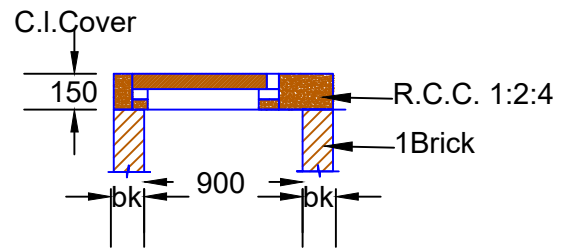
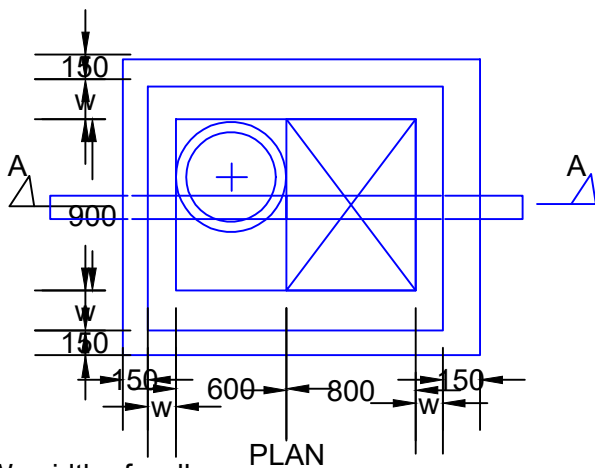
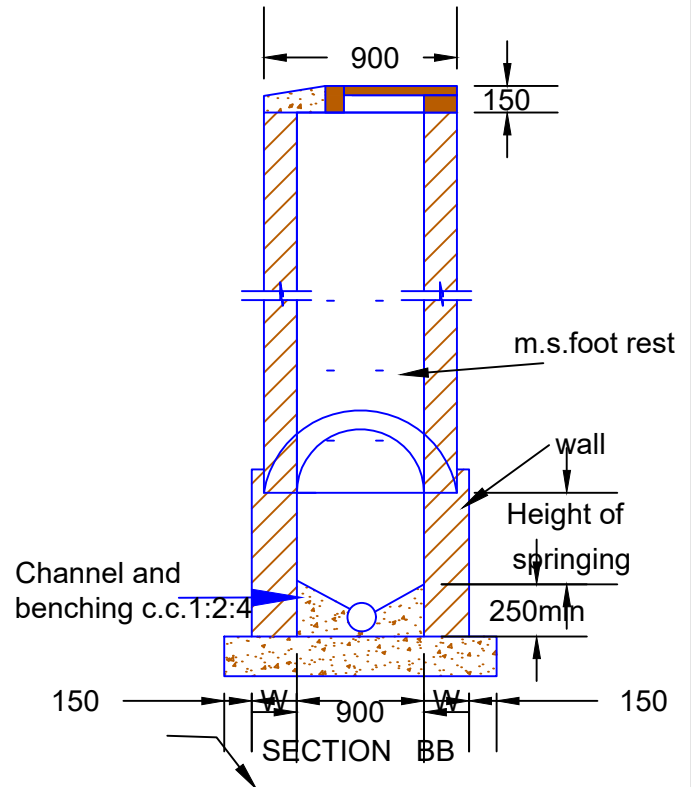
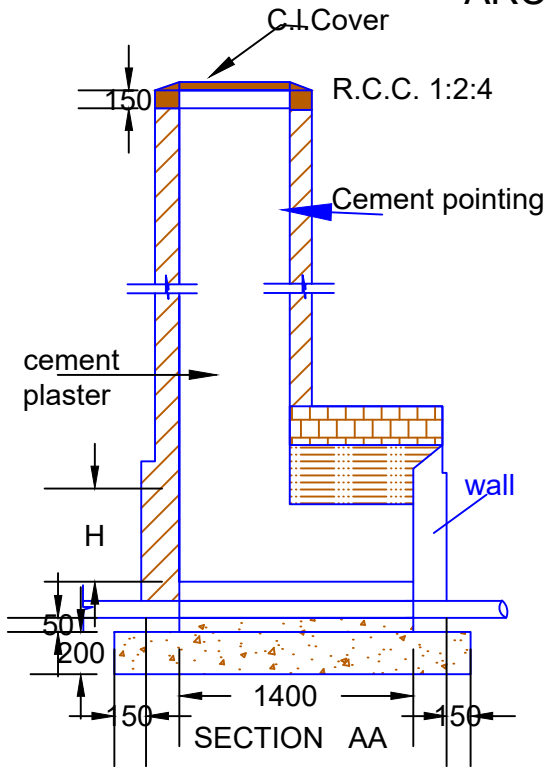


BAR BENDING SCHEDULE

Mark	diamm	no	length	Bending
a	12	4	1200	100—100 1000
b	12	4	1300	100—100 1100
c	12	1	580	100—100 380
d	12	1	625	100—100 425

DRAWING NO.11

ARCHED TYPE 1400X900

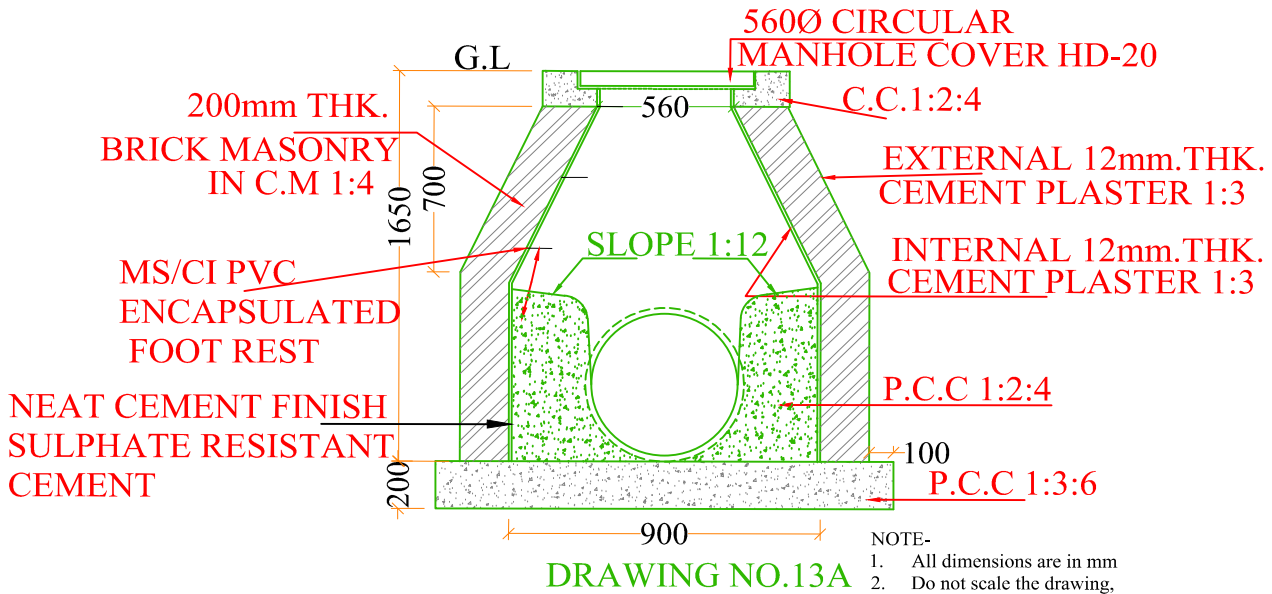


W- width of wall
 H- height of spring of arch above the benching level
 T- t hickness of foundation con.

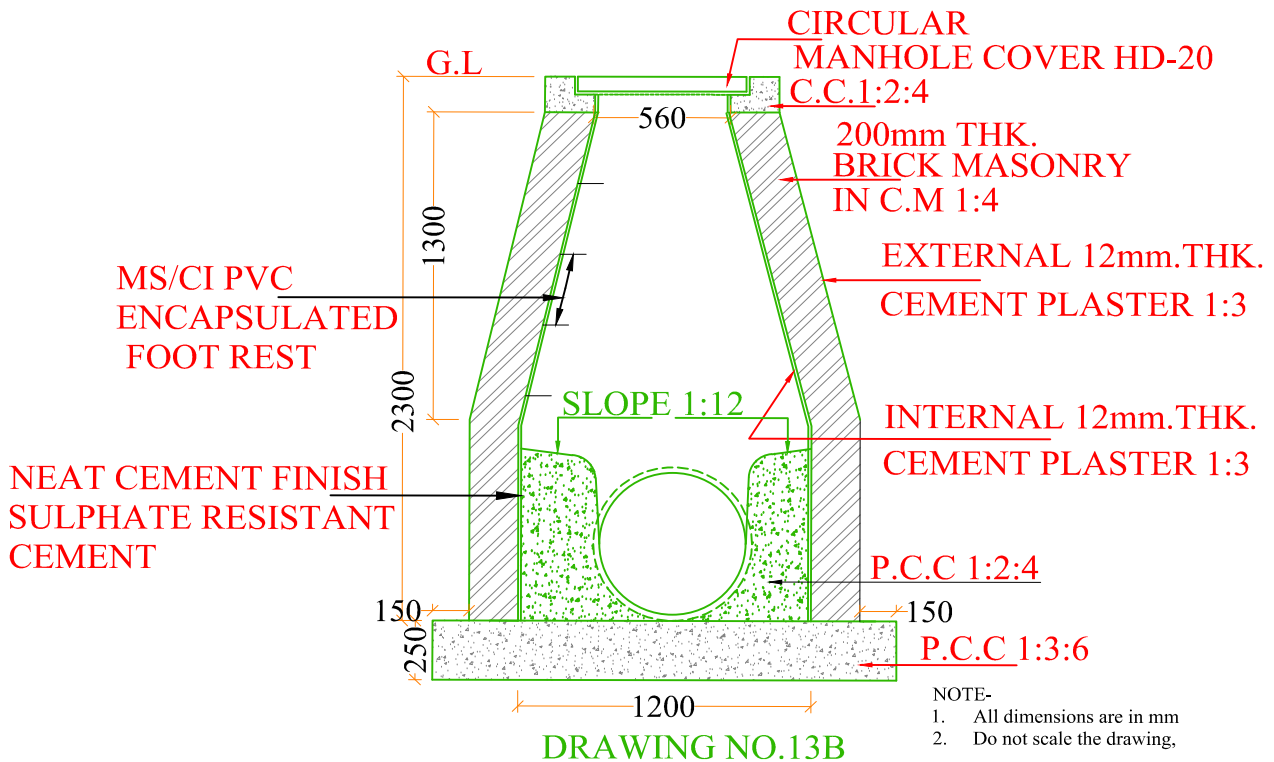
BAR BENDING SCHEDULE				
Mark	diamm	no	length	Bending
a	12	5	1000	100—100 800
b	12	3	1300	100—100 1100
c	12	1	680	100—100 480
a	12	5	1000	100—100 800
b	12	2	1300	100—100 1100
c	12	1	620	100—100 420

DRAWING NO.12

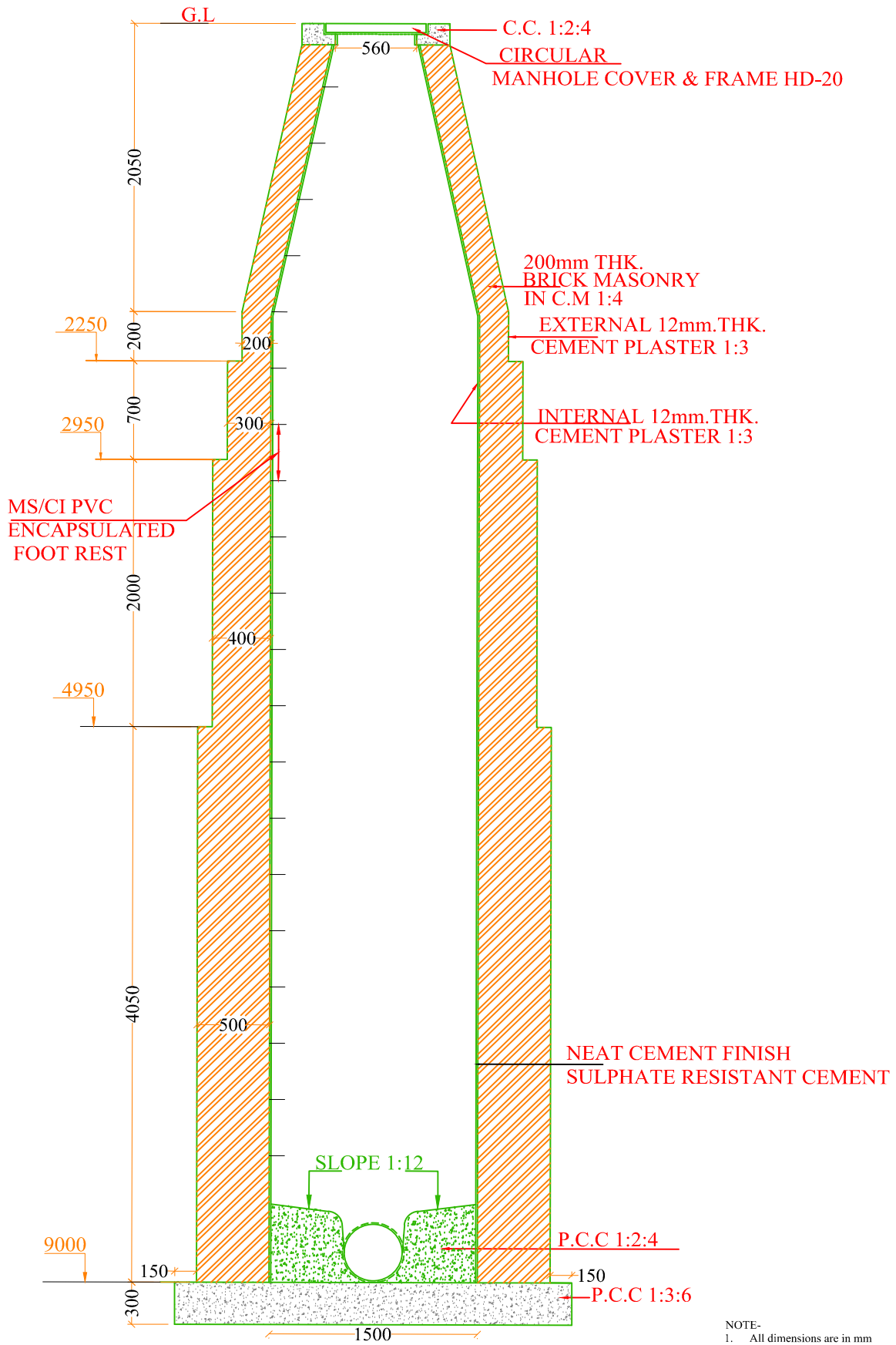
**CIRCULAR BRICK MANHOLE 900mm
INTERNAL DIAMETER**



**CIRCULAR BRICK MANHOLE 1200mm
INTERNAL DIAMETER**



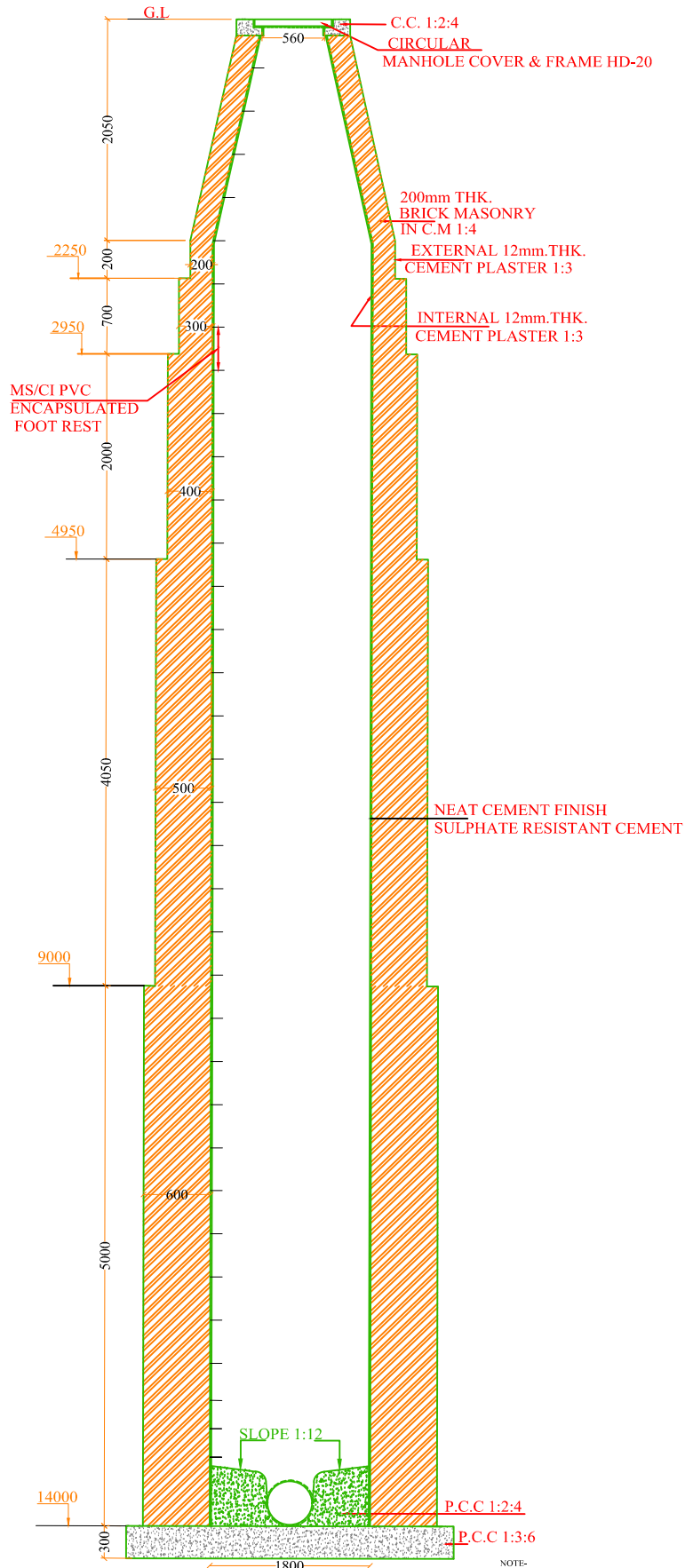
CIRCULAR BRICK MANHOLE 1500mm INTERNAL DIAMETER



NOTE-
 1. All dimensions are in mm
 2. Do not scale the drawing.

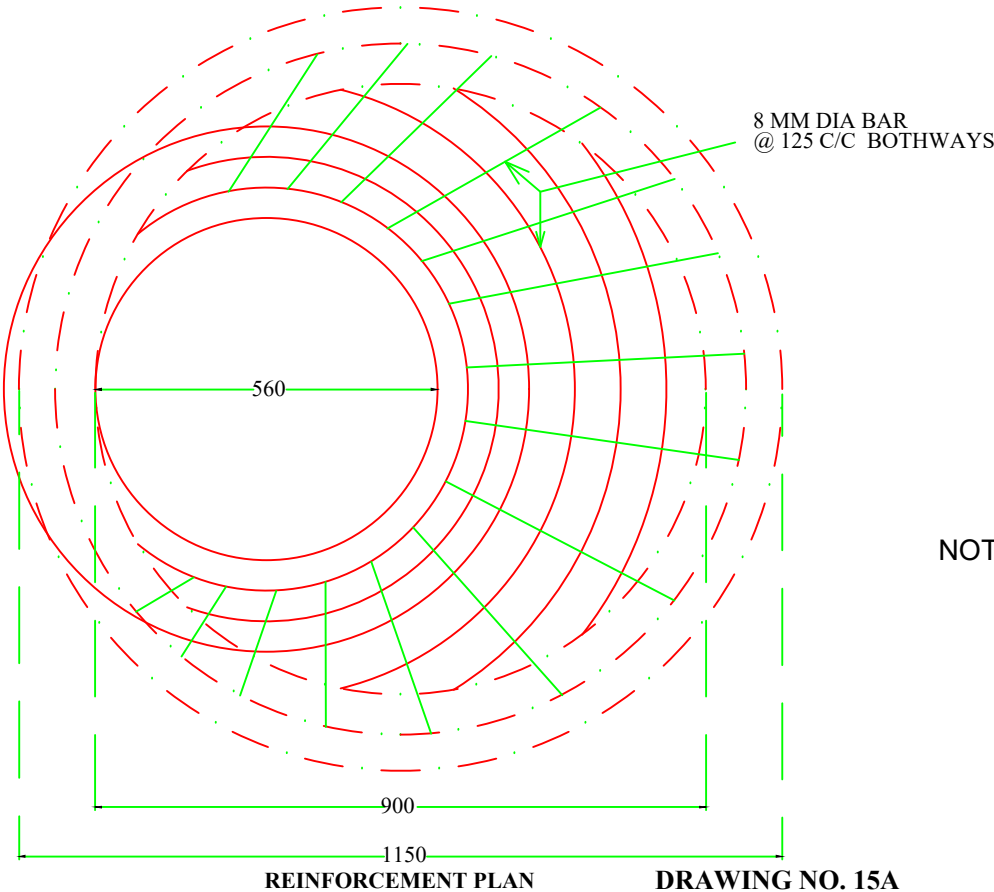
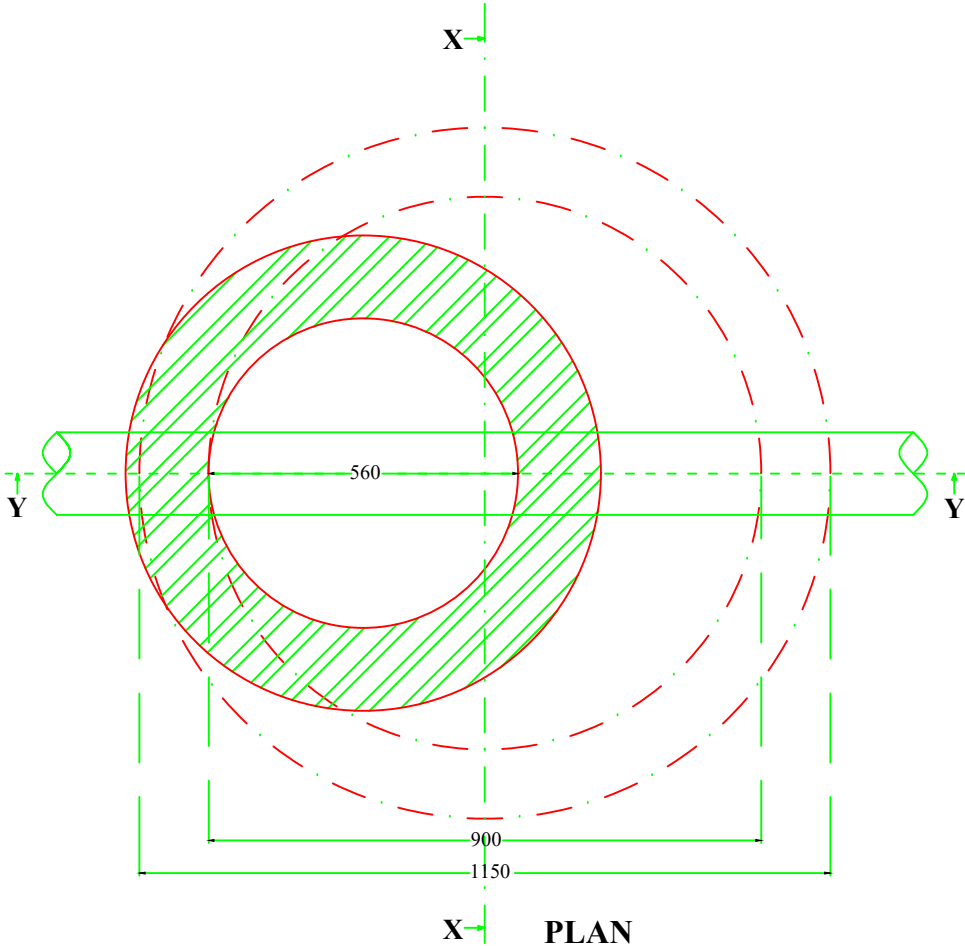
DRAWING NO.14 A

CIRCULAR BRICK MANHOLE 1800mm INTERNAL DIAMETER



NOTE-
 1. All dimensions are in mm
 2. Do not scale the drawing.

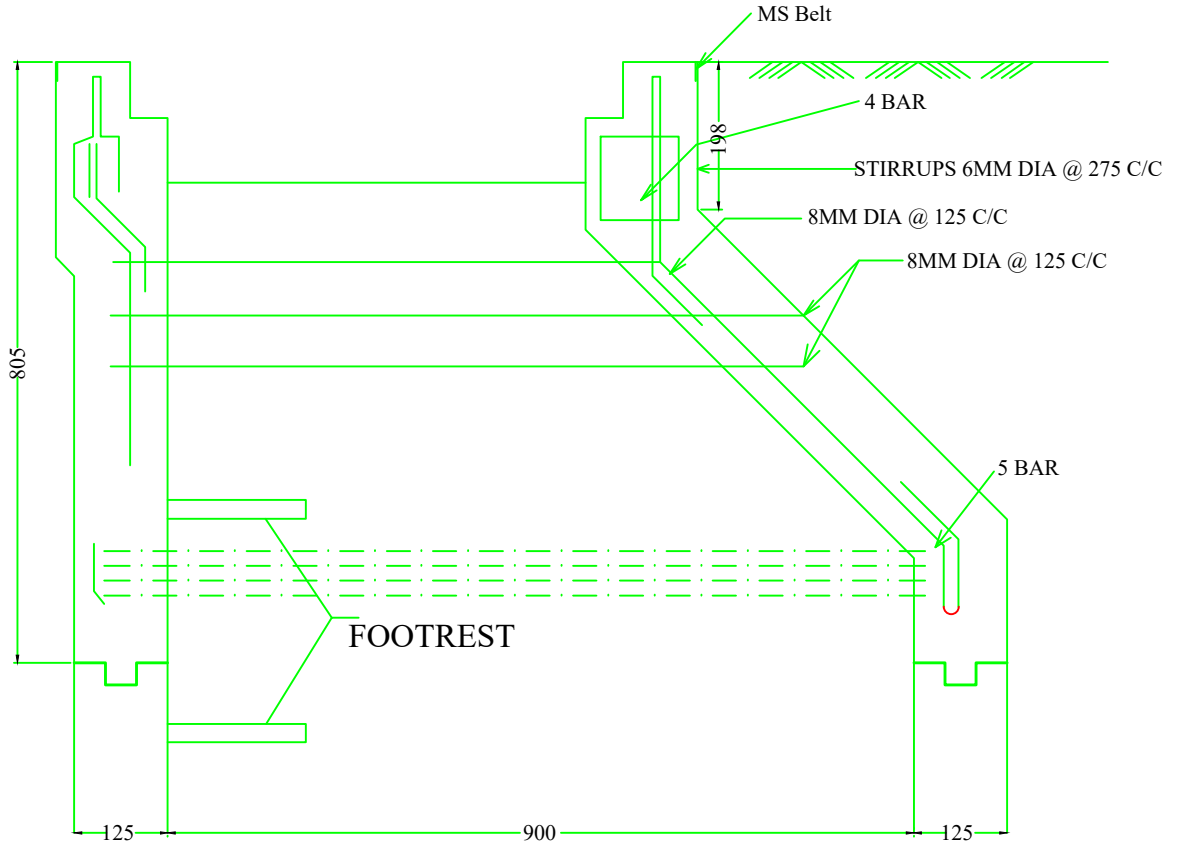
DRAWING FOR CIRCULAR PRECAST MANHOLE 900 MM DIA



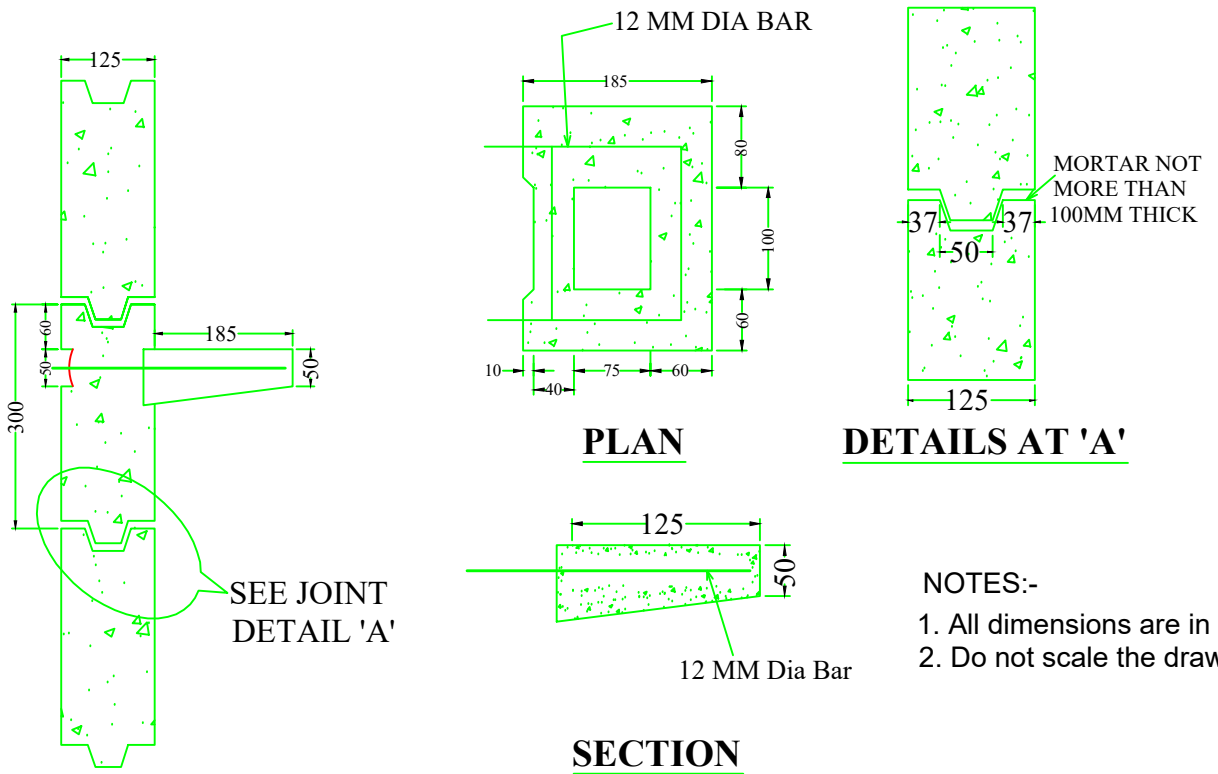
NOTES:-

- 1. All dimensions are in mm
- 2. Do not scale the drawing

DRAWING FOR CIRCULAR PRECAST MANHOLE 900 MM DIA



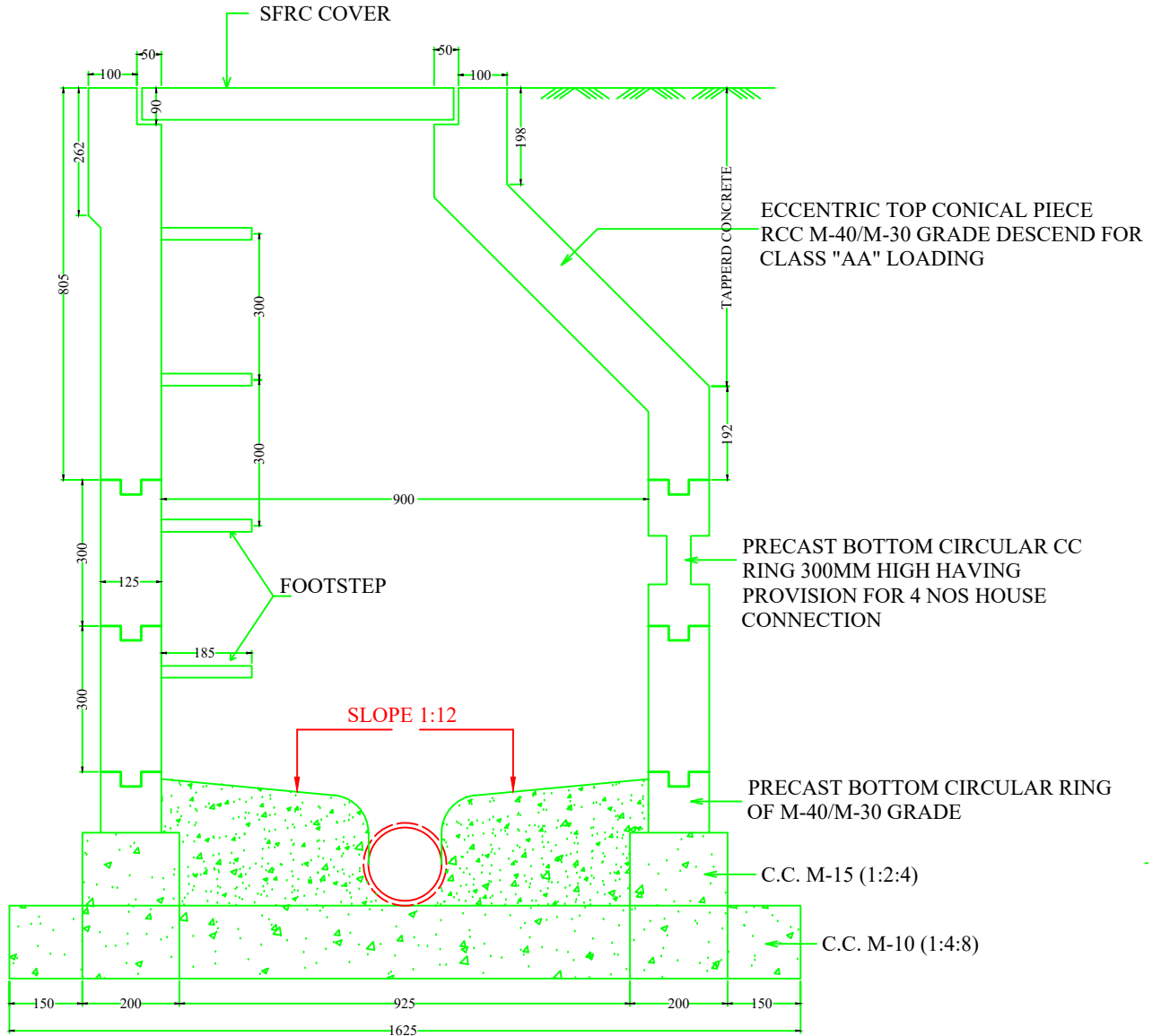
REINFORCEMENT DETAIL OF TOP CONICAL PIECE



DETAILS OF FIXING FOOT STEP

DRAWING NO. 15B

DRAWING FOR CIRCULAR PRECAST MANHOLE 900 MM DIA



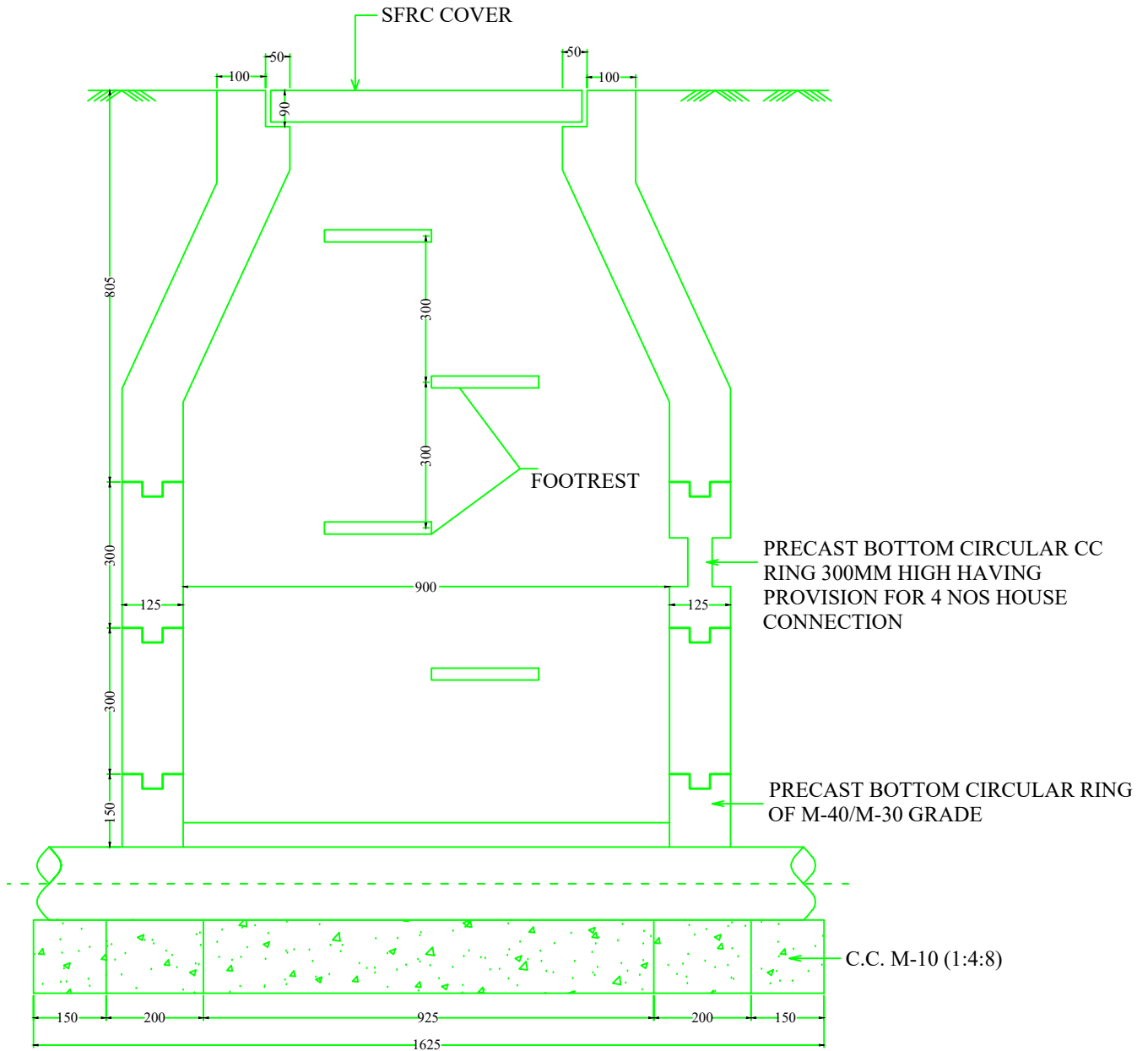
SECTION AT Y-Y

NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO. 15C

DRAWING FOR CIRCULAR PRECAST MANHOLE 900 MM DIA



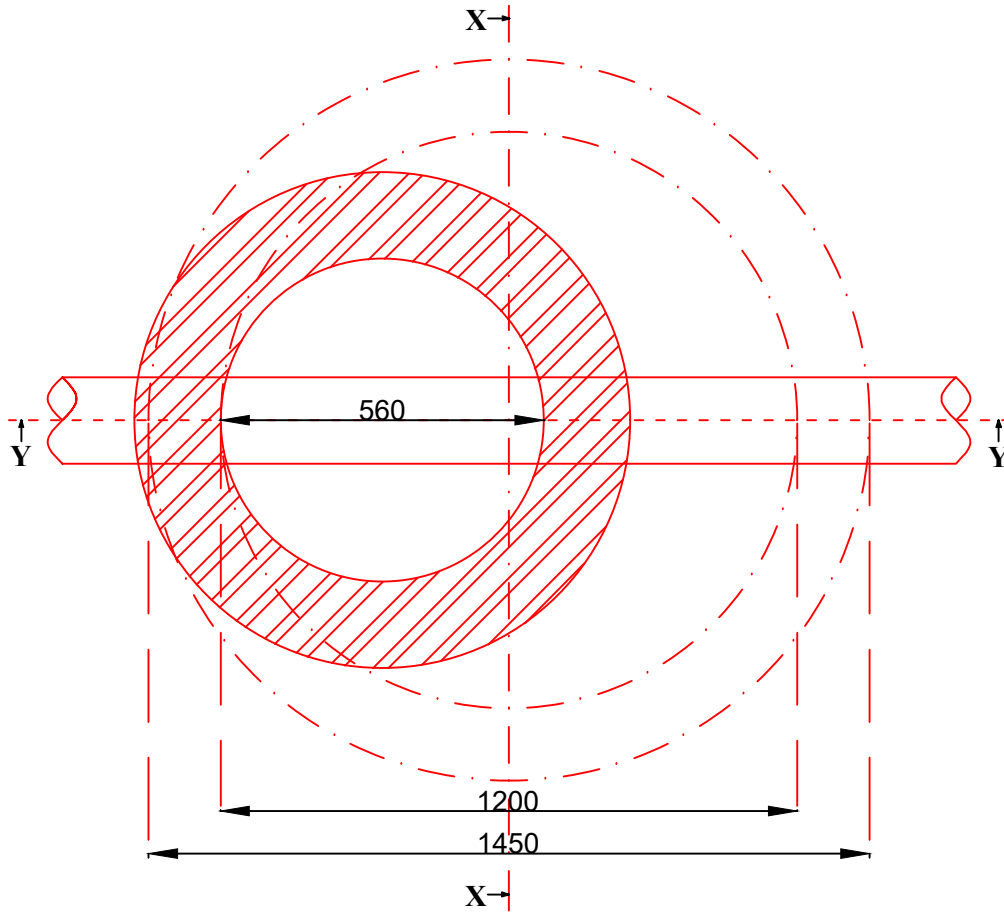
SECTION AT X-X

NOTES:-

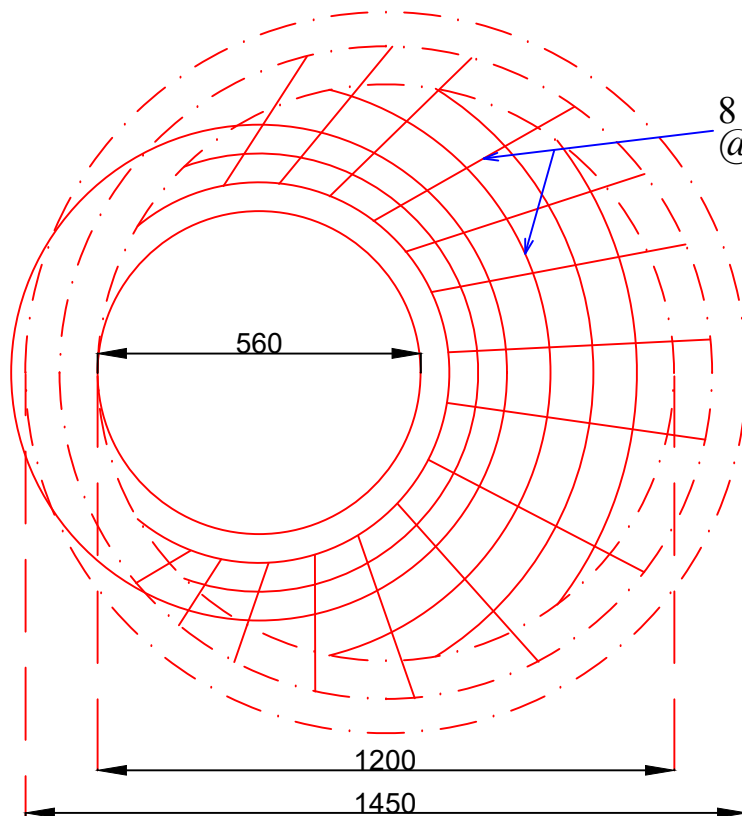
1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO. 15D

DRAWING FOR CIRCULAR PRECAST MANHOLE 1200 MM DIA



PLAN



8 MM DIA BAR
@ 125 C/C BOTHWAYS

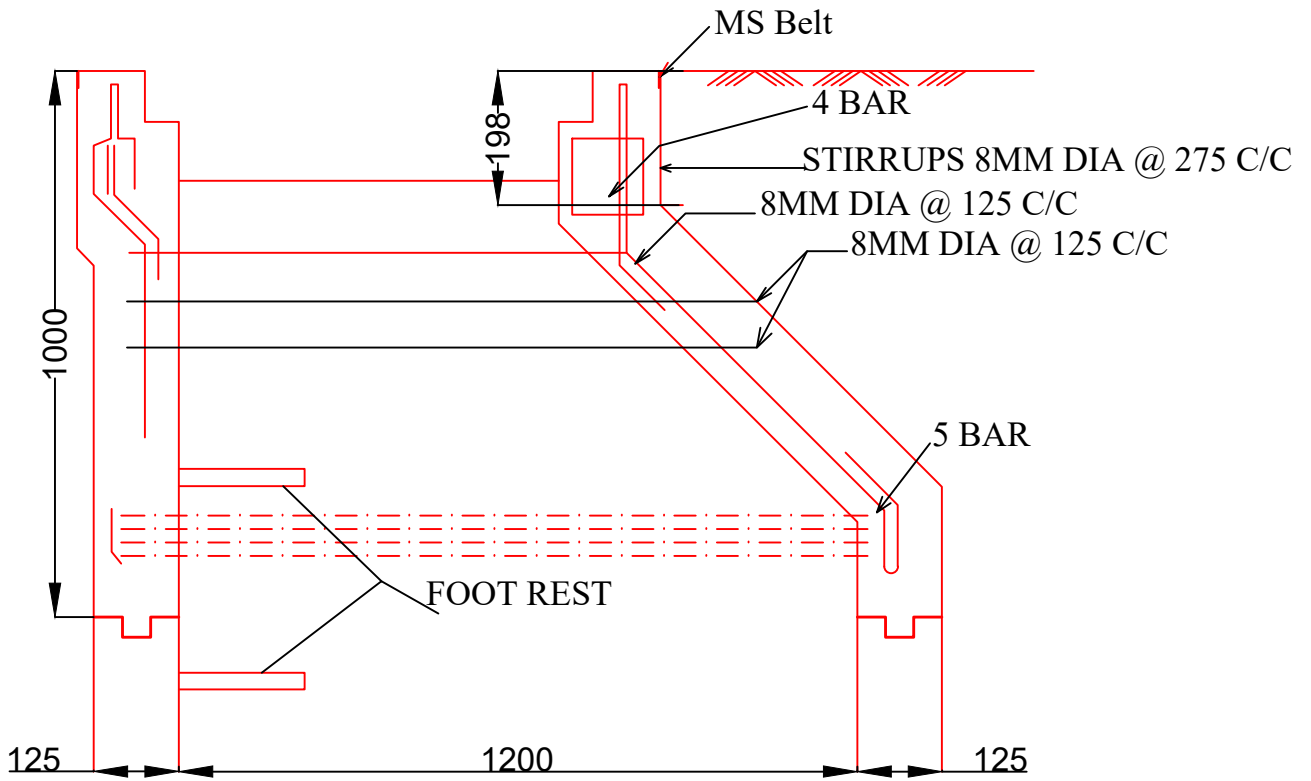
NOTES:-

- 1. All dimensions are in mm
- 2. Do not scale the drawing

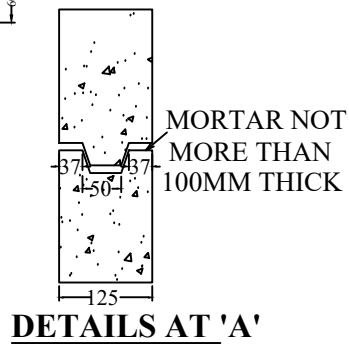
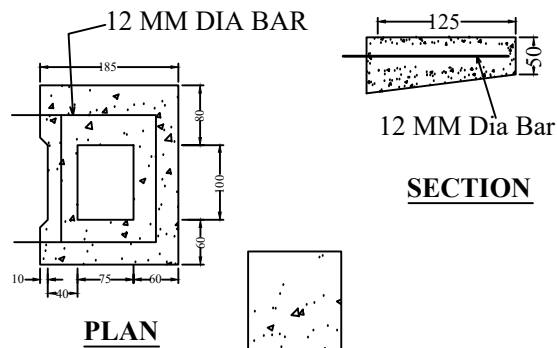
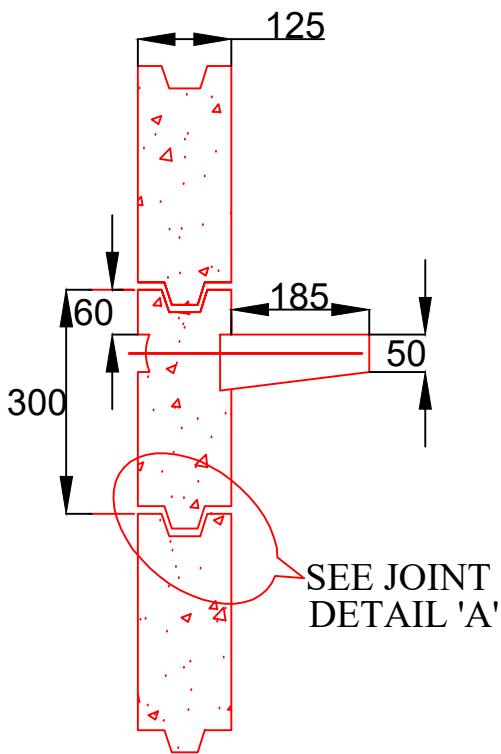
REINFORCEMENT PLAN

DRAWING NO. 15E

DRAWING FOR CIRCULAR PRECAST MANHOLE 1200 MM DIA



REINFORCEMENT DETAIL OF TOP CONICAL PIECE



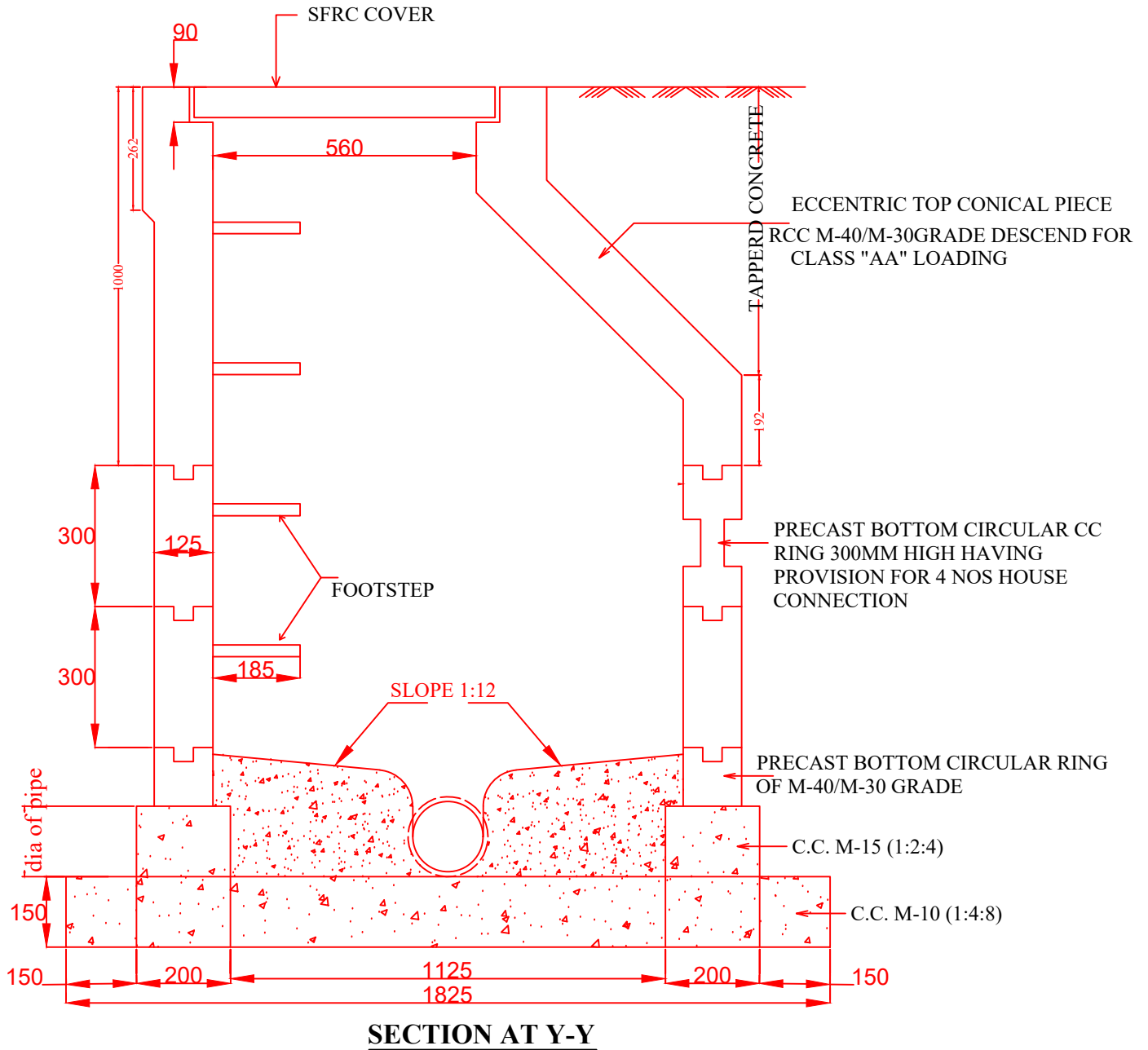
NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DETAILS OF FIXING FOOT STEP

DRAWING NO. 15F

DRAWING FOR CIRCULAR PRECAST MANHOLE 1200 MM DIA

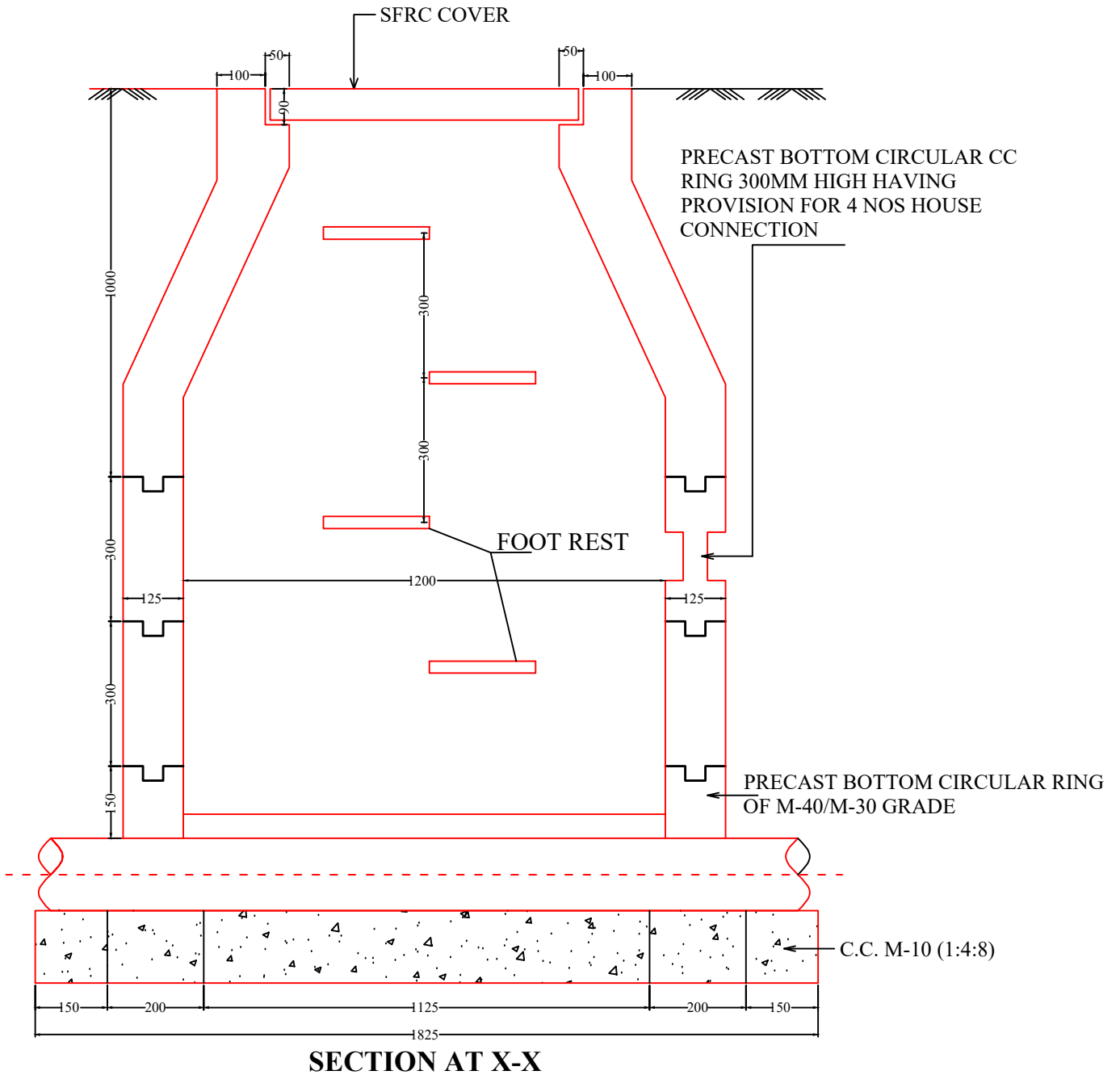


NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO. 15G

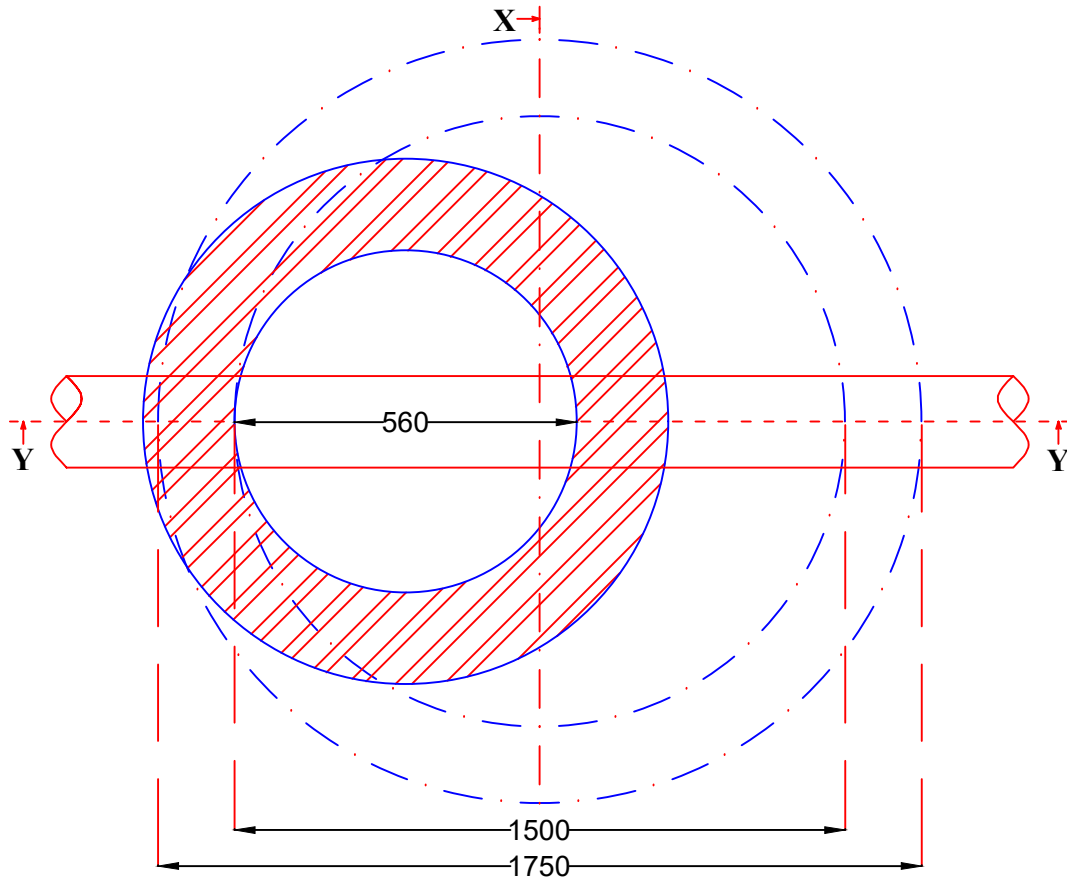
DRAWING FOR CIRCULAR PRECAST MANHOLE 1200 MM DIA



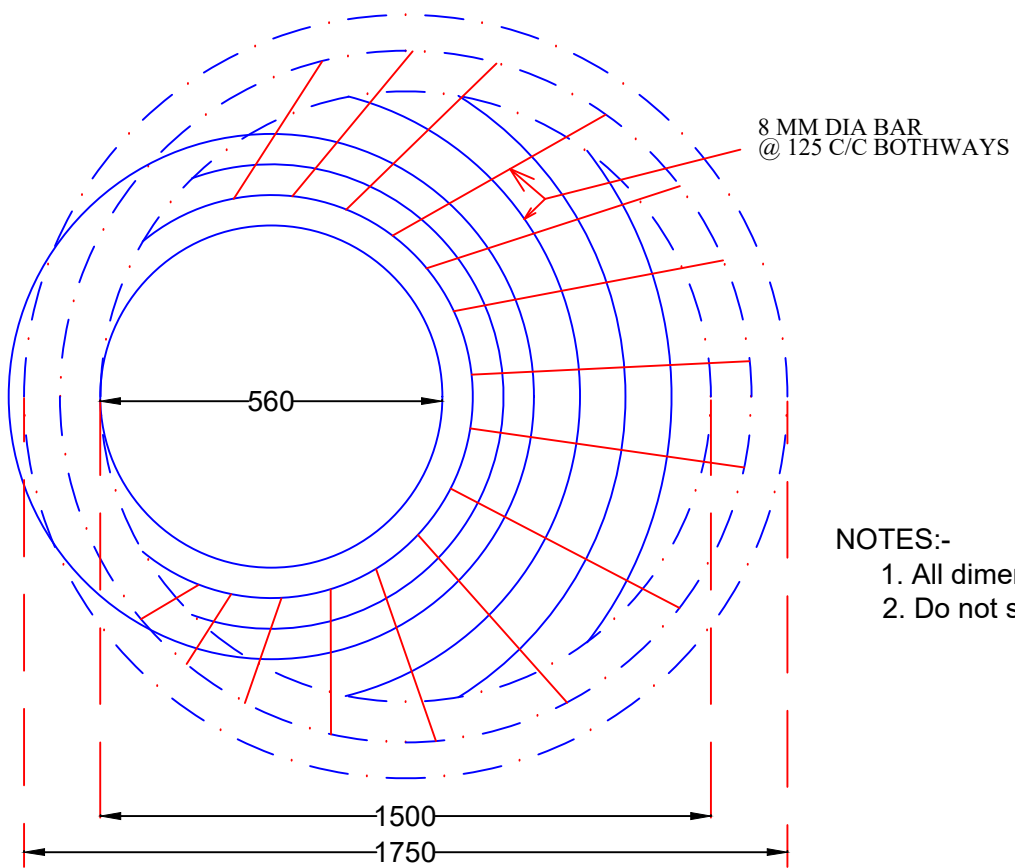
- NOTES:-
1. All dimensions are in mm
 2. Do not scale the drawing

DRAWING NO. 15H

DRAWING FOR CIRCULAR PRECAST MANHOLE 1500 MM DIA



PLAN



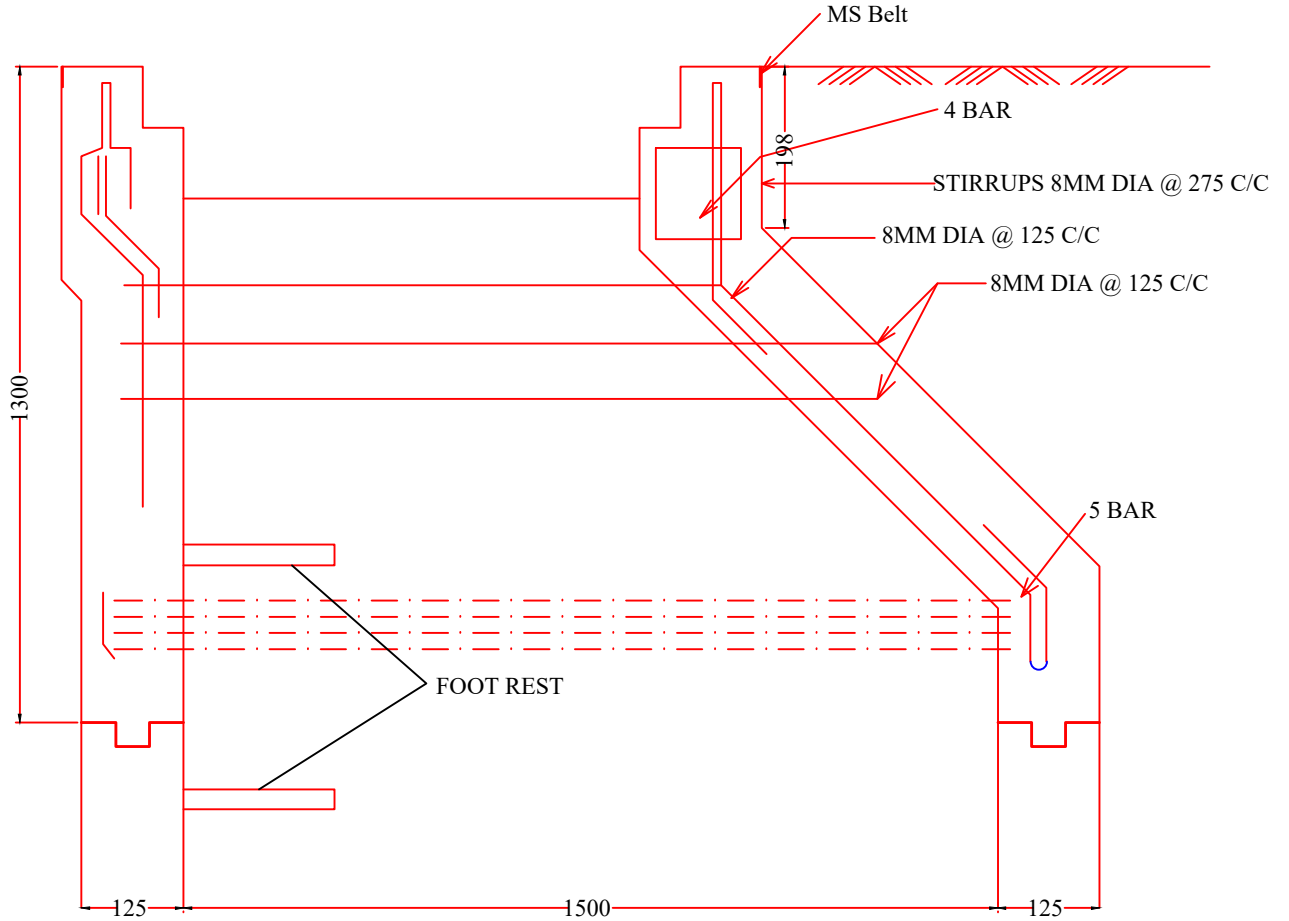
NOTES:-

- 1. All dimensions are in mm
- 2. Do not scale the drawing

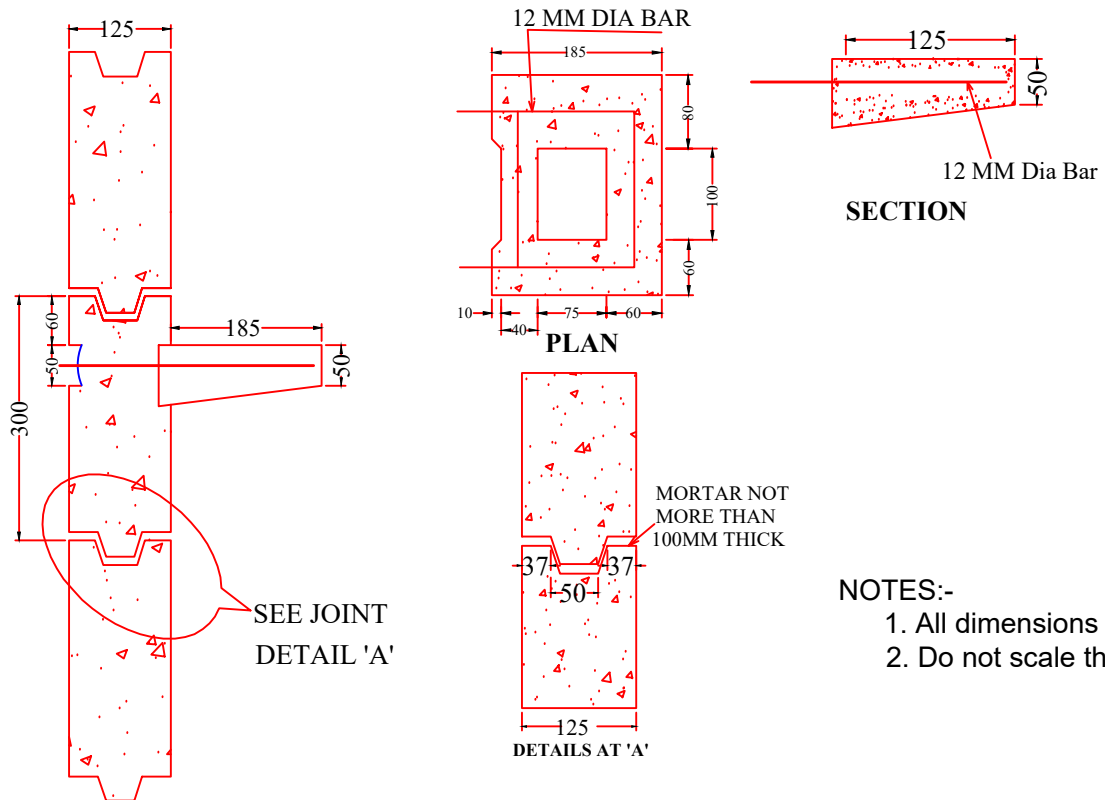
REINFORCEMENT PLAN

DRAWING NO. 15I

DRAWING FOR CIRCULAR PRECAST MANHOLE 1500 MM DIA



REINFORCEMENT DETAIL OF TOP CONICAL PIECE

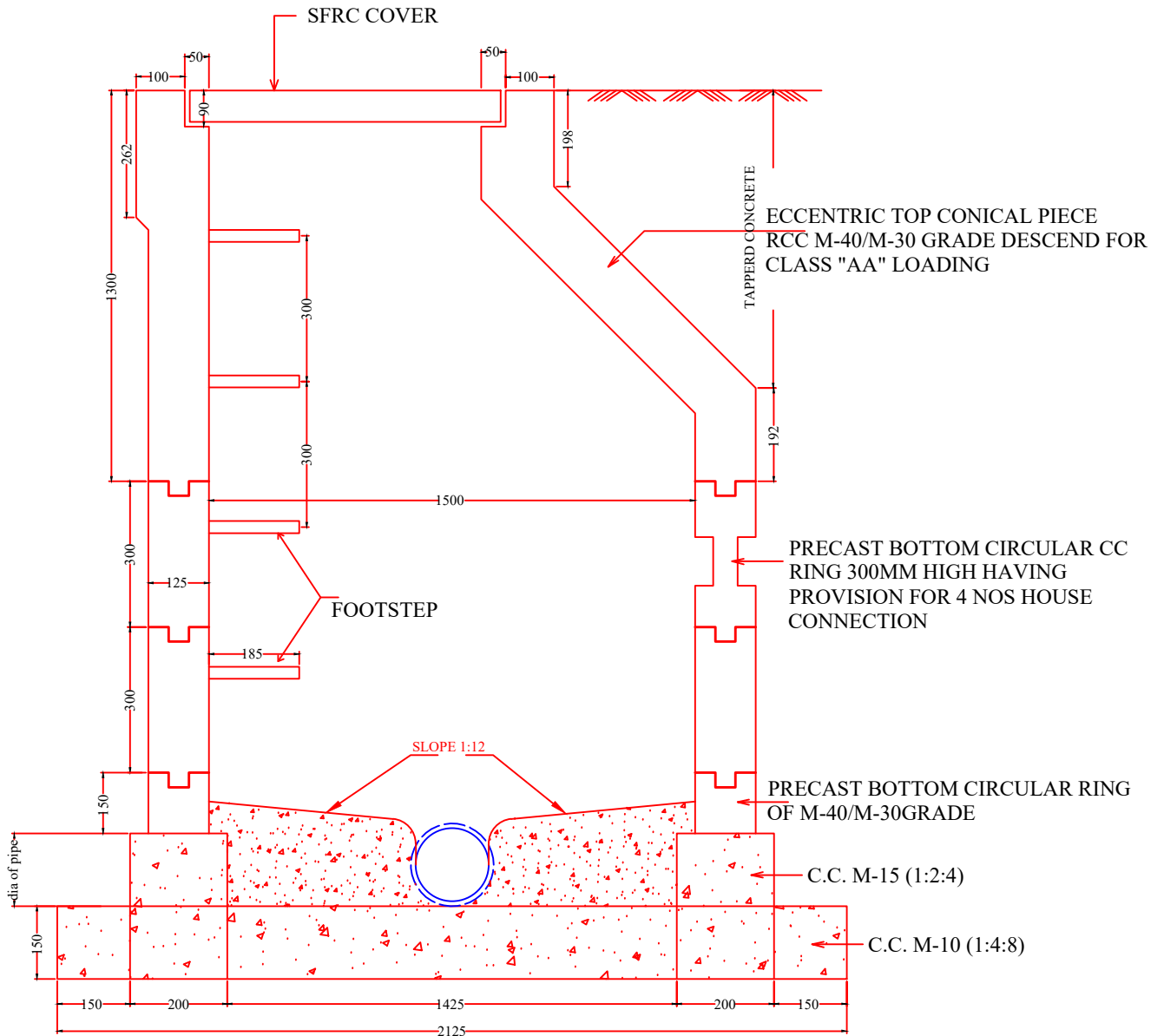


- NOTES:-**
1. All dimensions are in mm
 2. Do not scale the drawing

DETAILS OF FIXING FOOT STEP

DRAWING NO. 15J

DRAWING FOR CIRCULAR PRECAST MANHOLE 1500 MM DIA



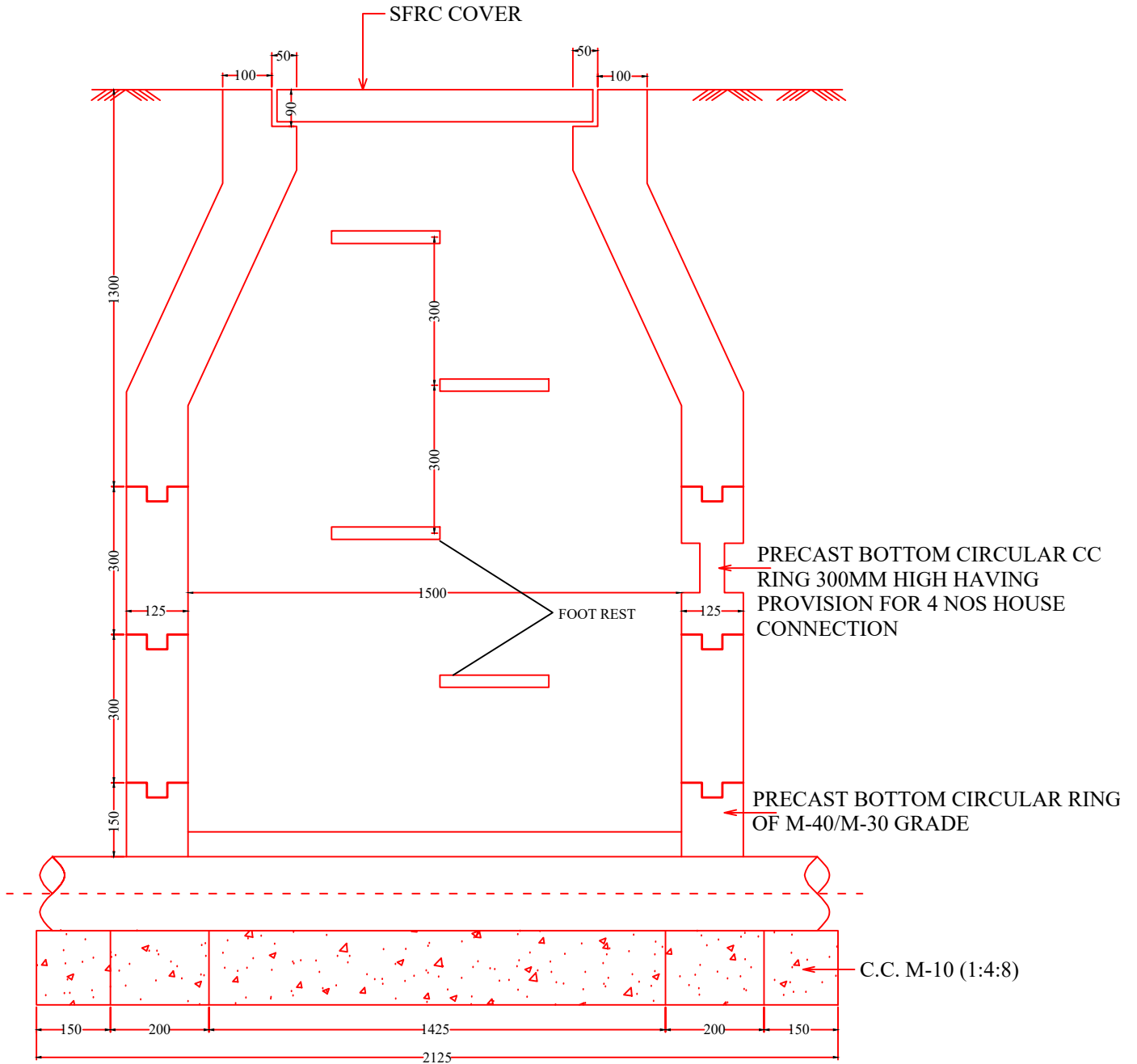
SECTION AT Y-Y

NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO. 15K

DRAWING FOR CIRCULAR PRECAST MANHOLE 1500 MM DIA



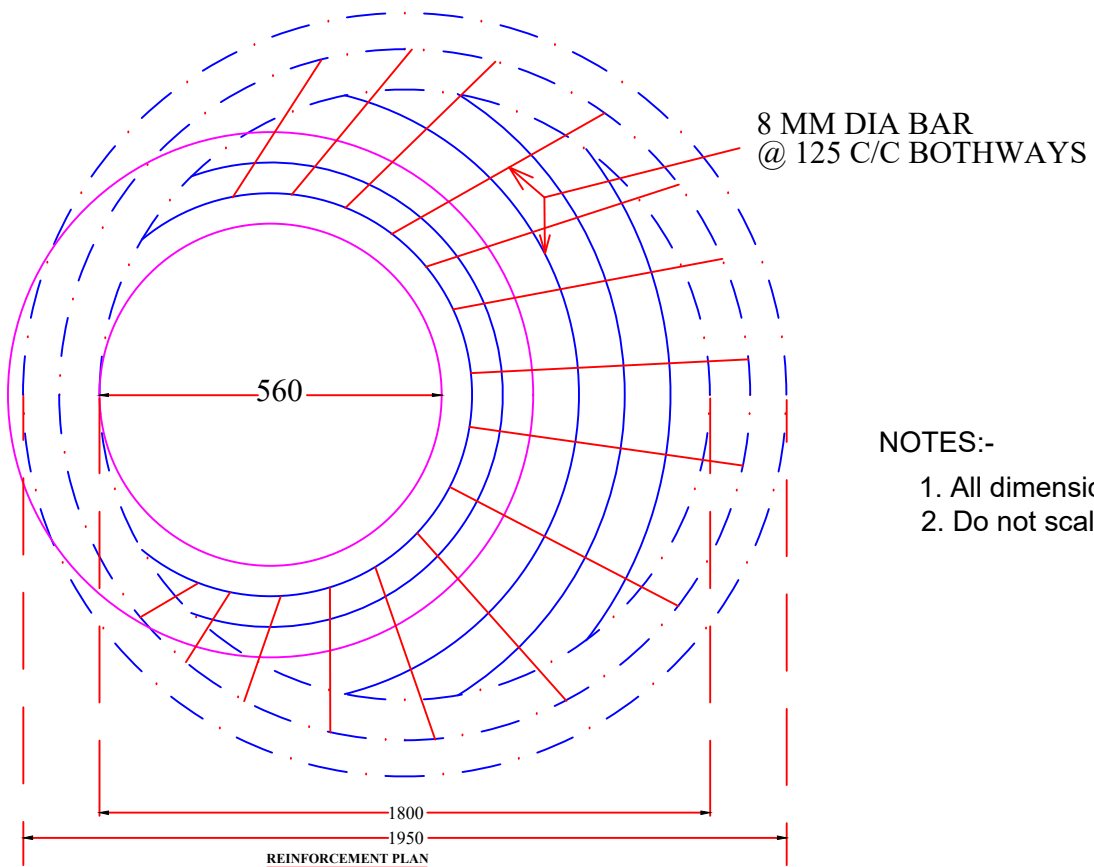
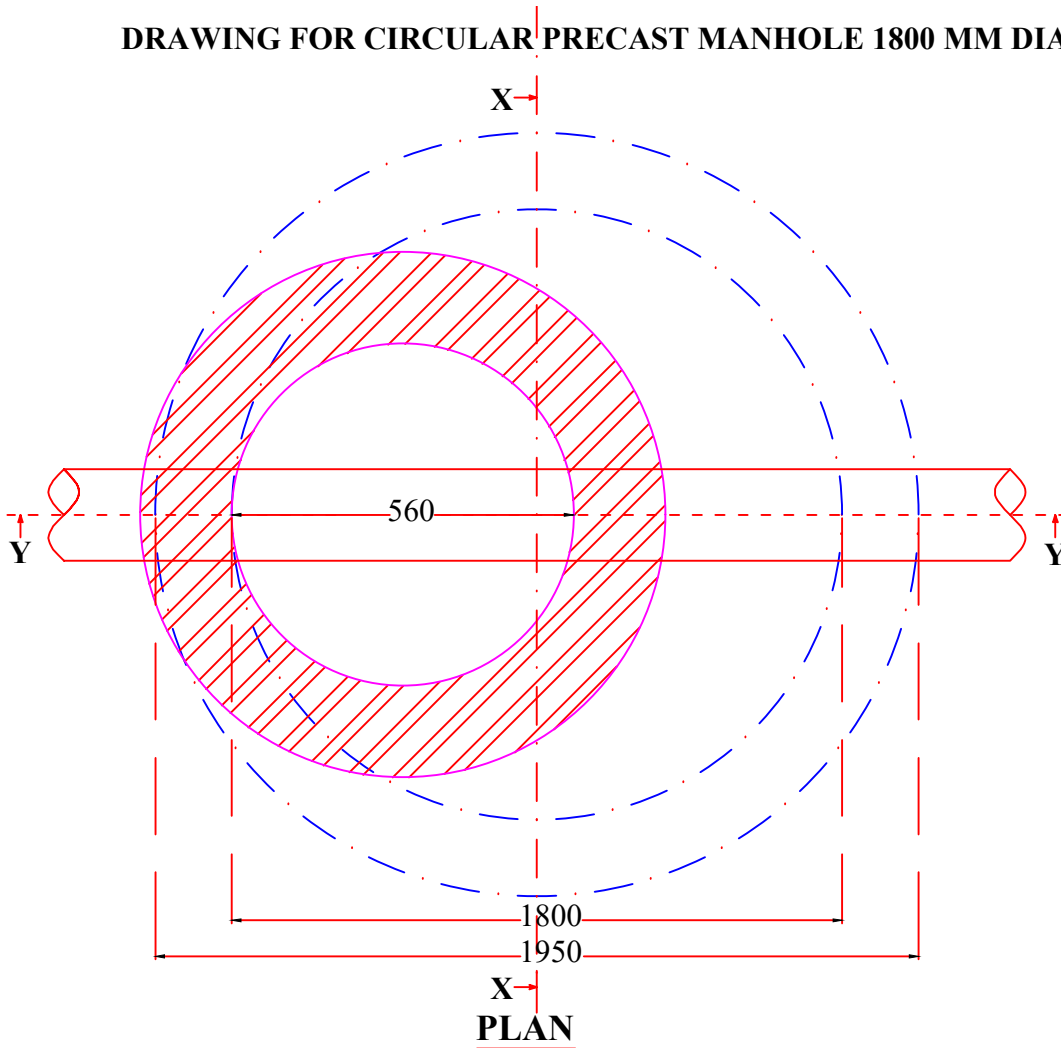
SECTION AT X-X

NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO. 15L

DRAWING FOR CIRCULAR PRECAST MANHOLE 1800 MM DIA

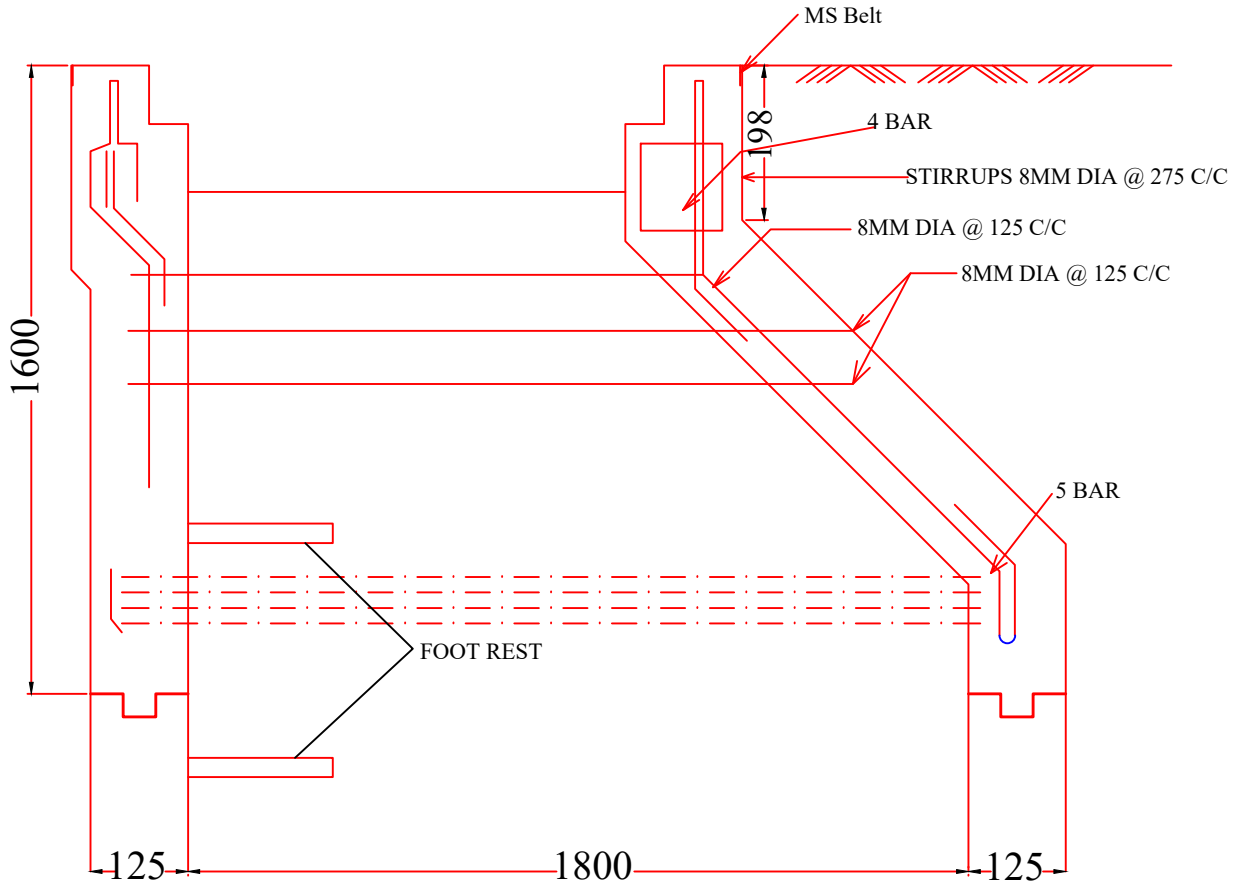


NOTES:-

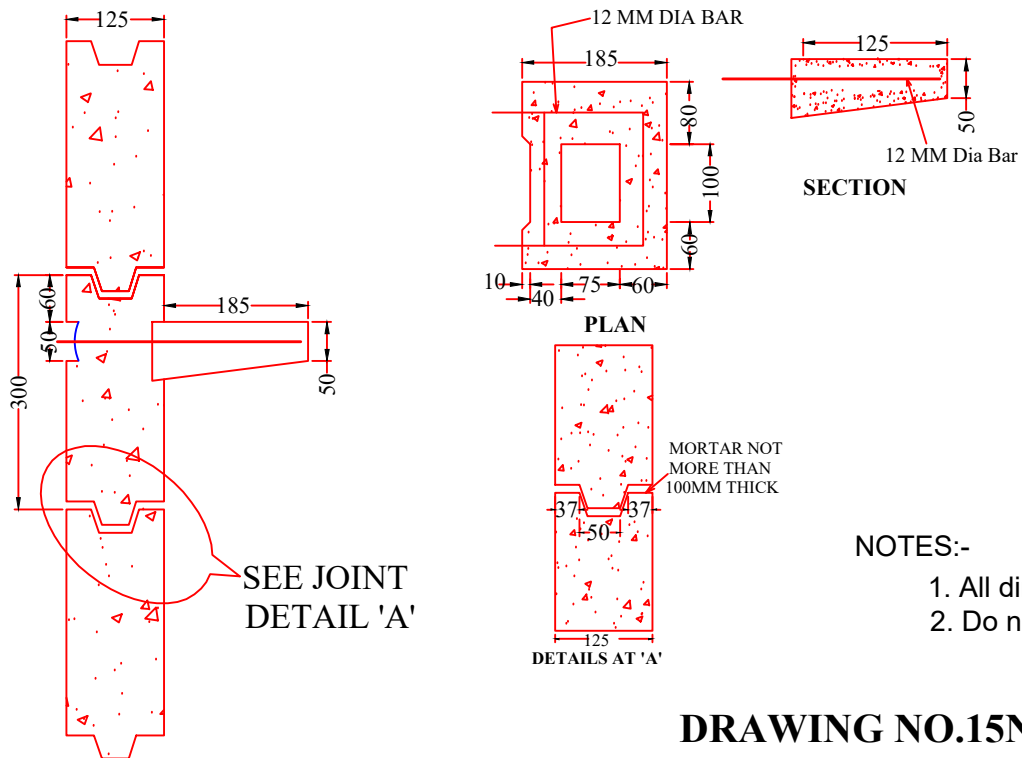
1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO.15M

DRAWING FOR CIRCULAR PRECAST MANHOLE 1800 MM DIA



REINFORCEMENT DETAIL OF TOP CONICAL PIECE



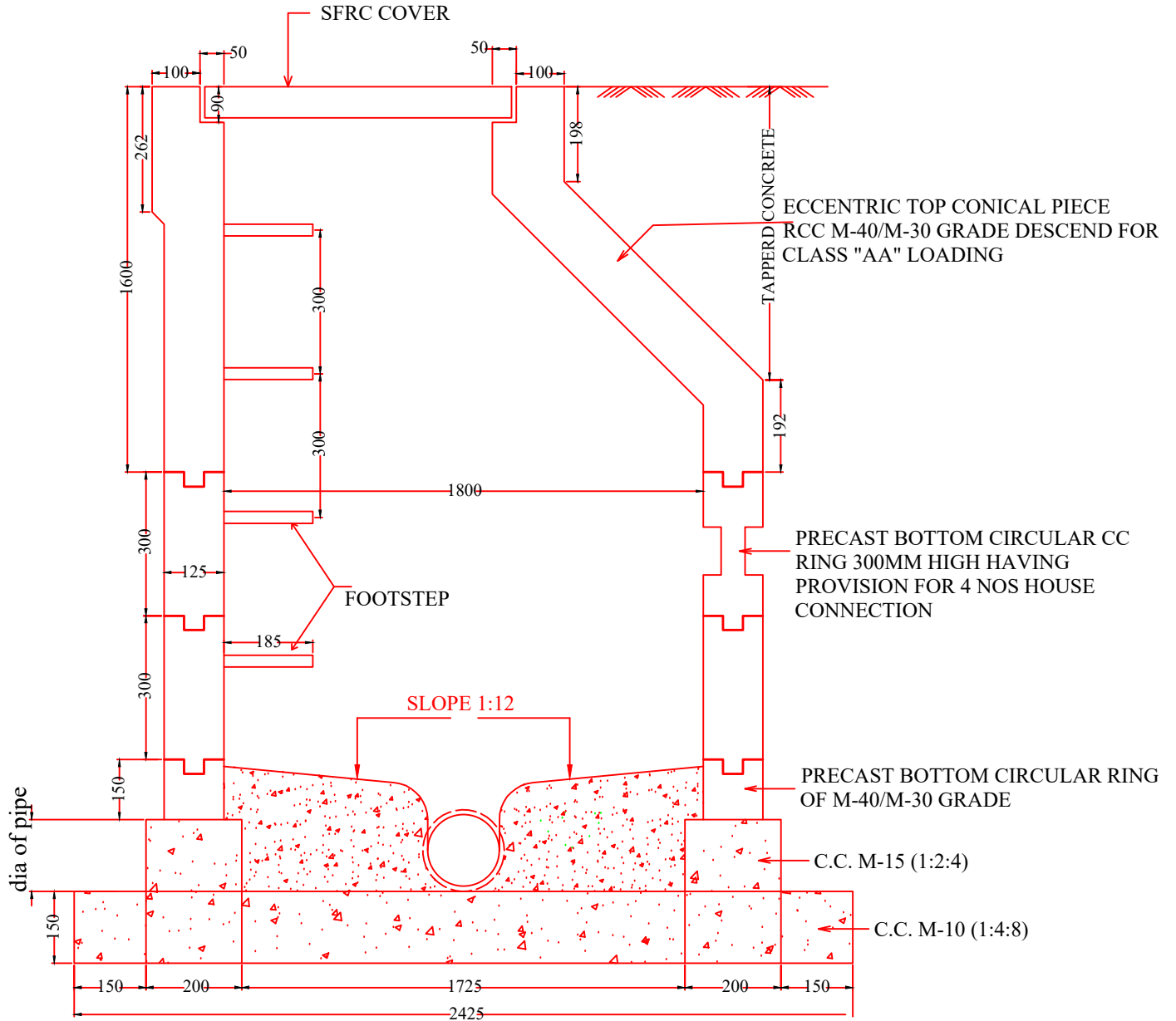
NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO.15N

DETAILS OF FIXING FOOT STEP

DRAWING FOR CIRCULAR PRECAST MANHOLE 1800 MM DIA



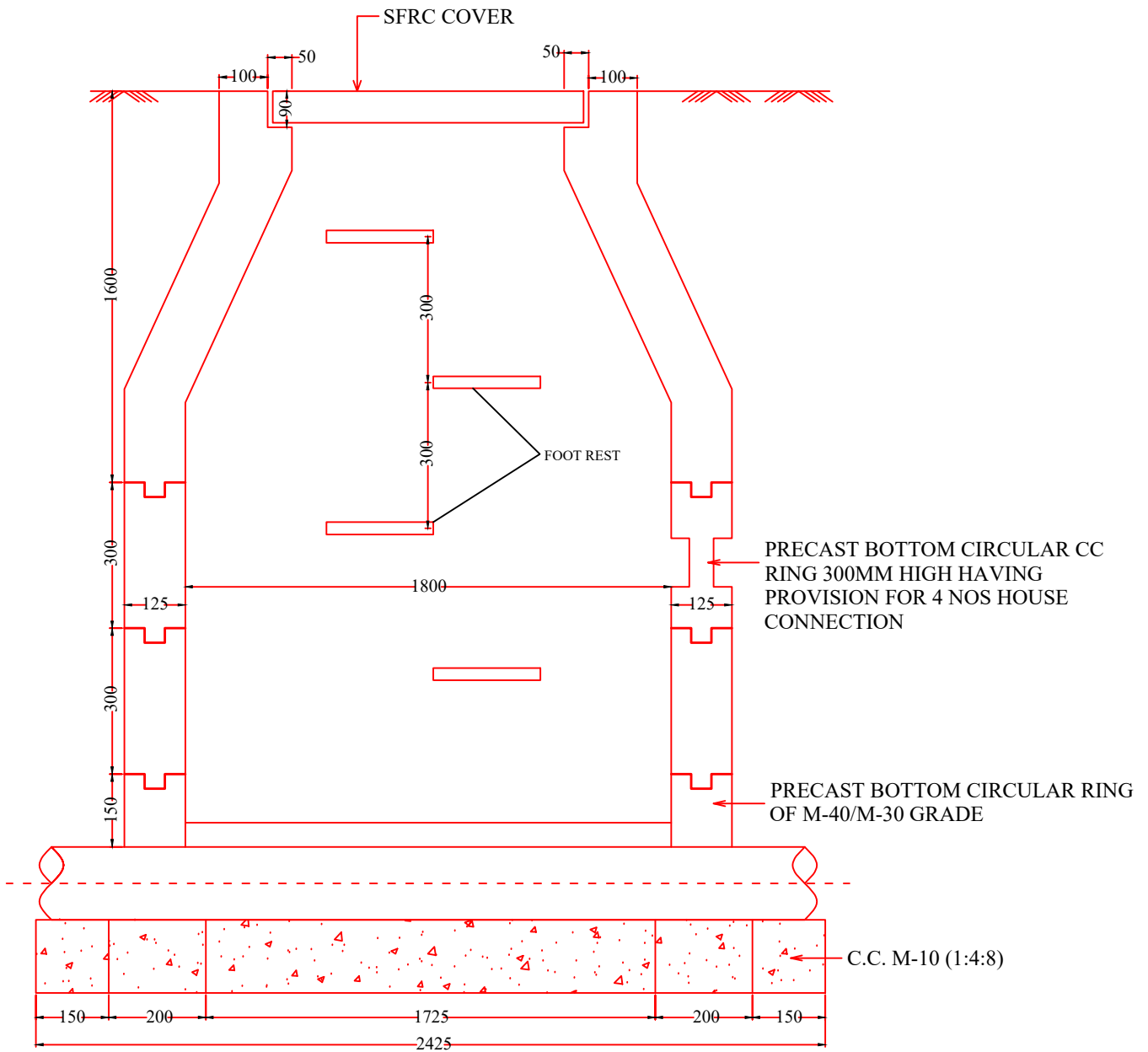
SECTION AT Y-Y

NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO. 15 O

DRAWING FOR CIRCULAR PRECAST MANHOLE 1800 MM DIA



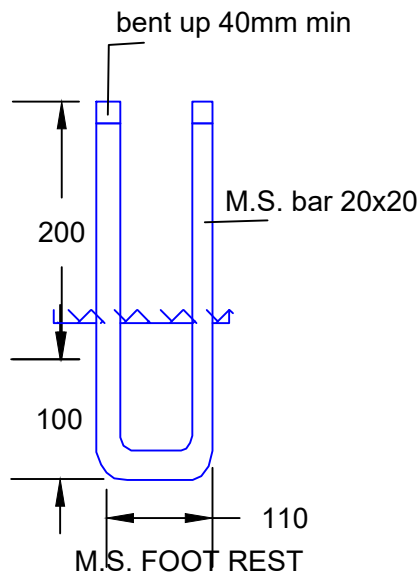
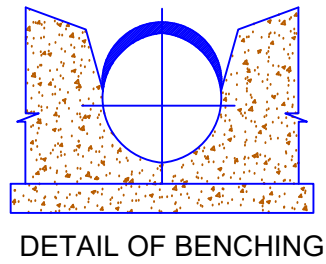
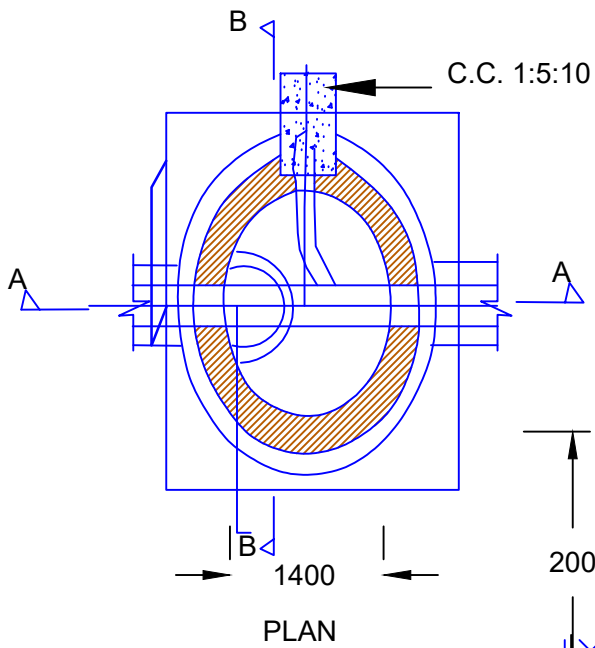
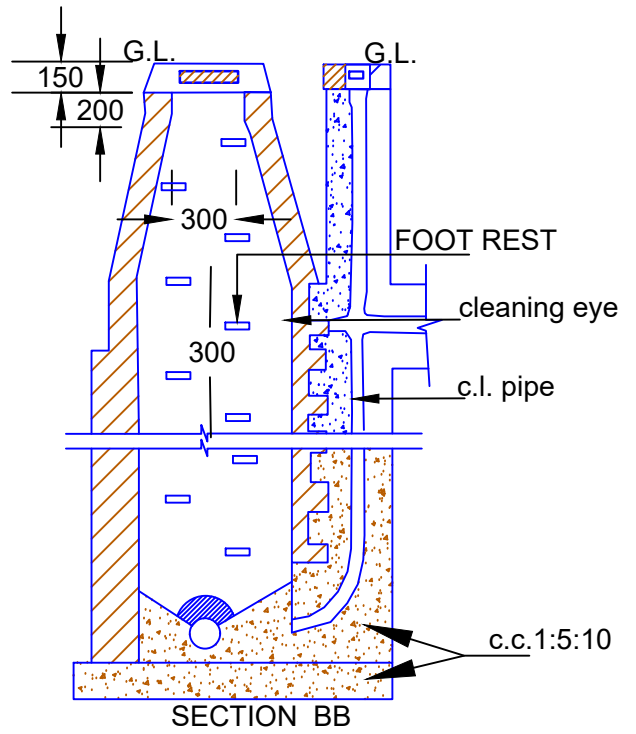
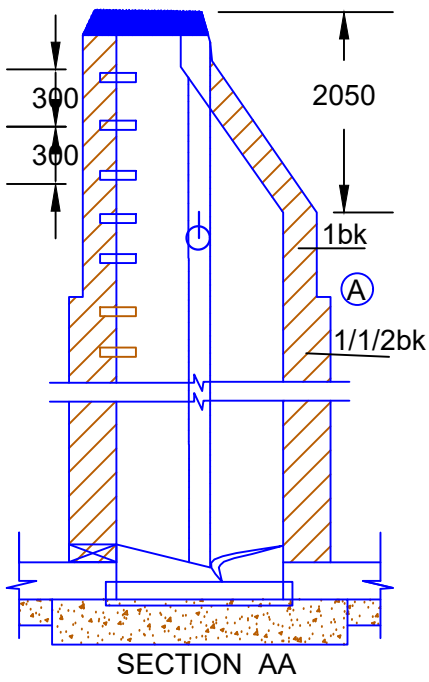
SECTION AT X-X

NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO. 15P

DROP MANHOLE WITH BENCHING

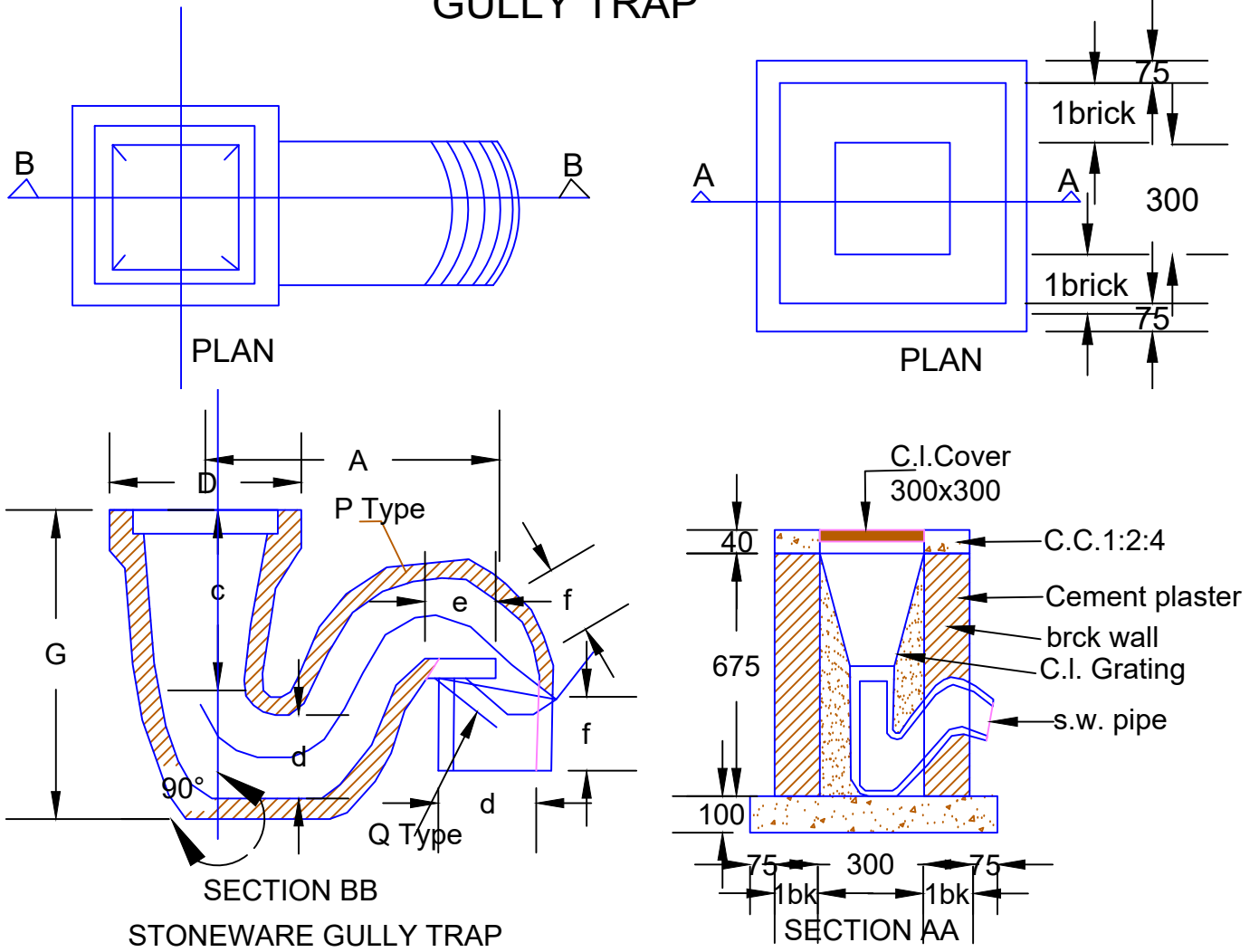


NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO.16

GULLY TRAP



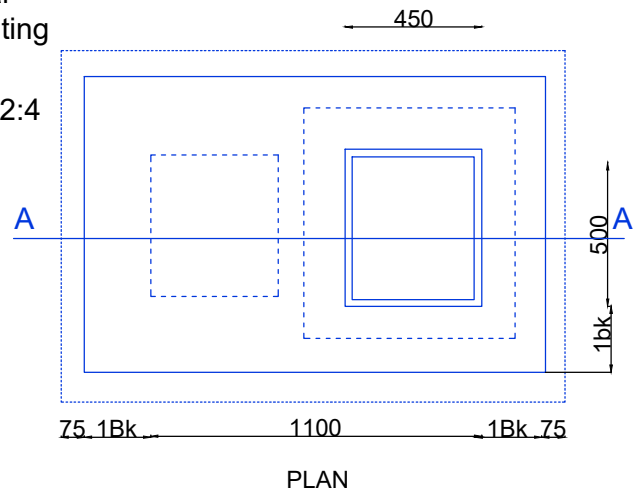
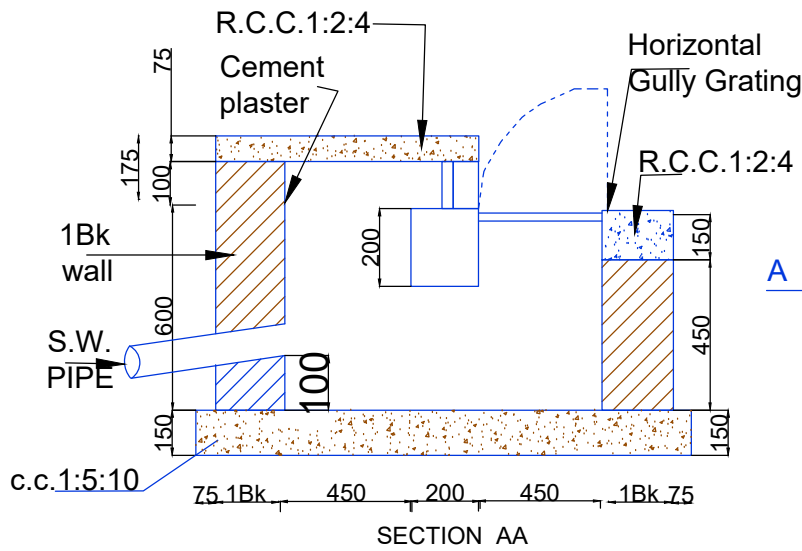
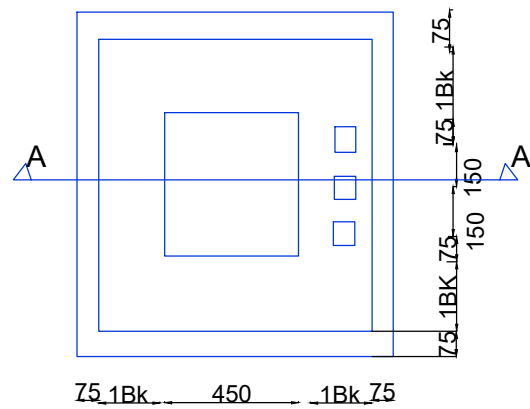
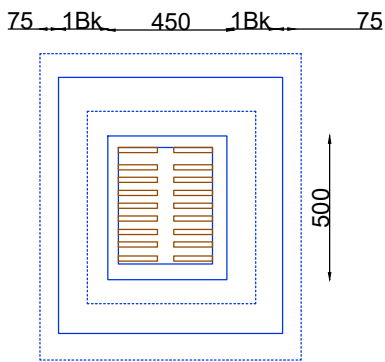
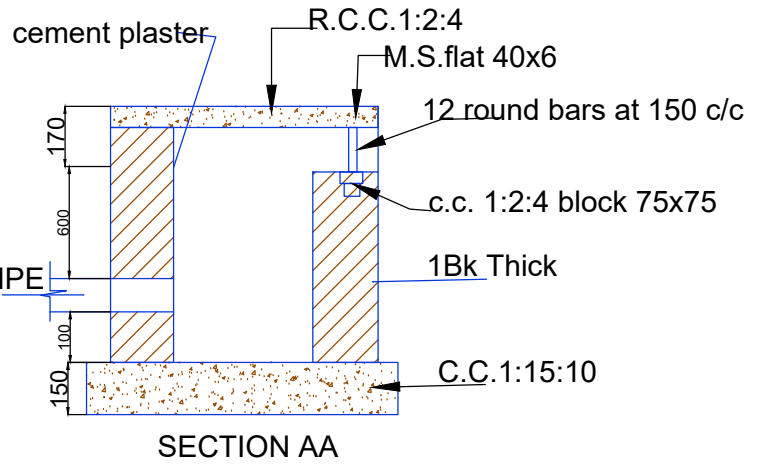
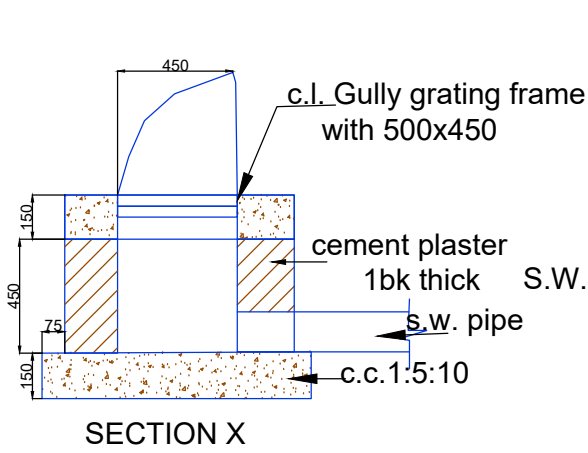
TYPE	SIZE	A	C	d	D	D	E	F	F	G
P	100X100	305	175	100	100	100	65	-	-	330
	125X100	265	165	100	125	100	60	-	-	345
	150X100	330	165	100	150	100	75	-	-	346
Q	180X100	320	200	100	100	100	65	-	-	380
	180X150	405	270	150	180	150	75	-	-	520
S	125X100	330	165	100	125	100	-	80	-	345
	125X100	290	185	100	125	100	-	-	115	346
	180X150	445	275	150	180	150	-	-	125	520

NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO.17

ROAD GULLY CHAMBER



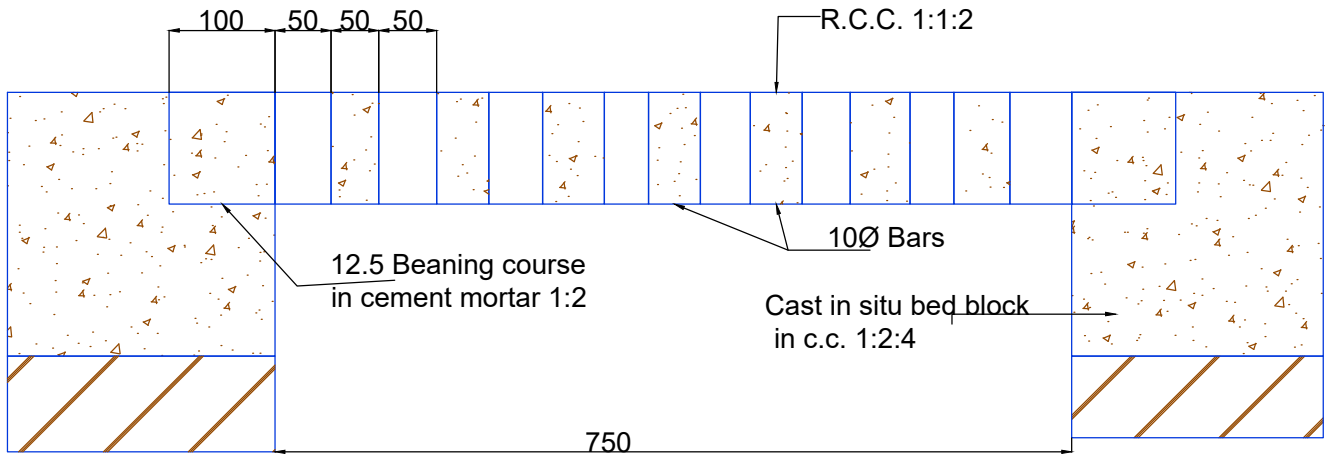
WITH HORIZONTAL AND VERTICAL GRATING

NOTES:-

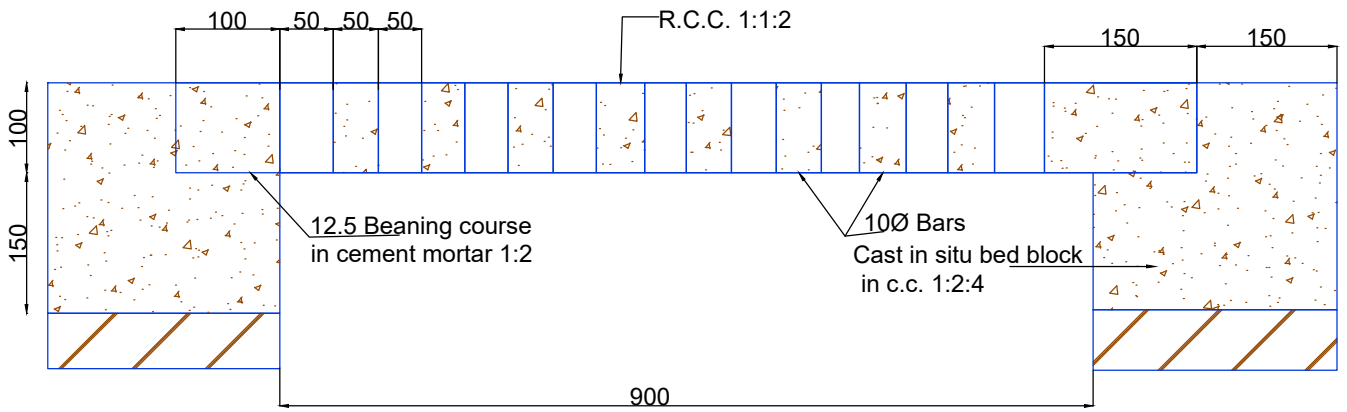
1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO. 18

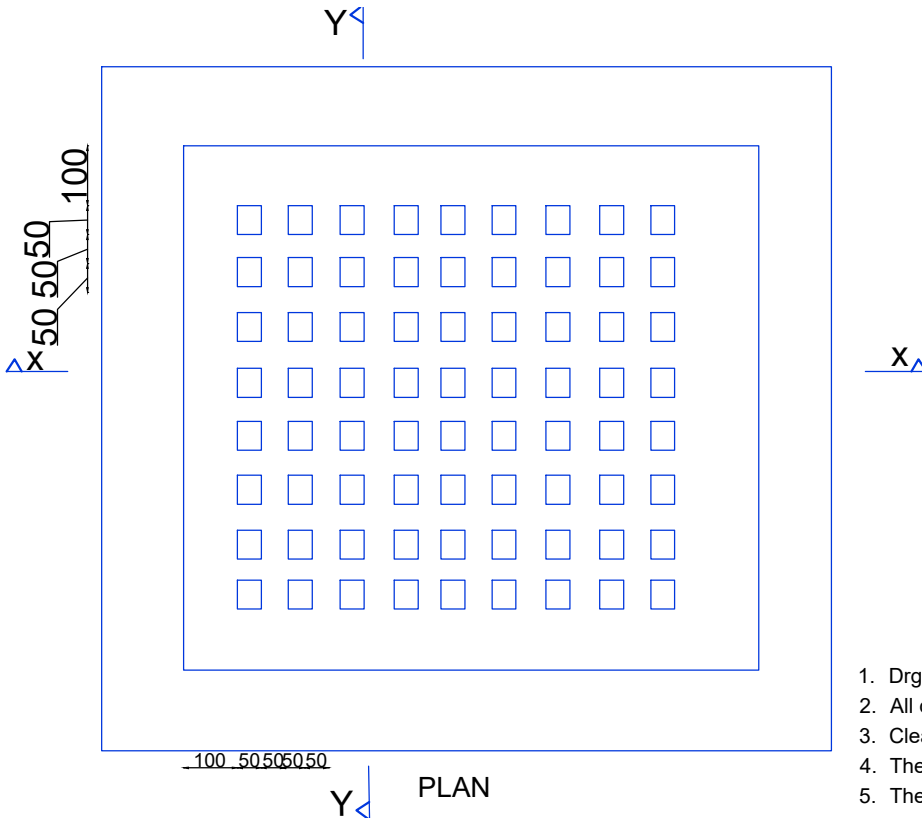
ROAD GULLY GRATING



SECTION YY



SECTION XX

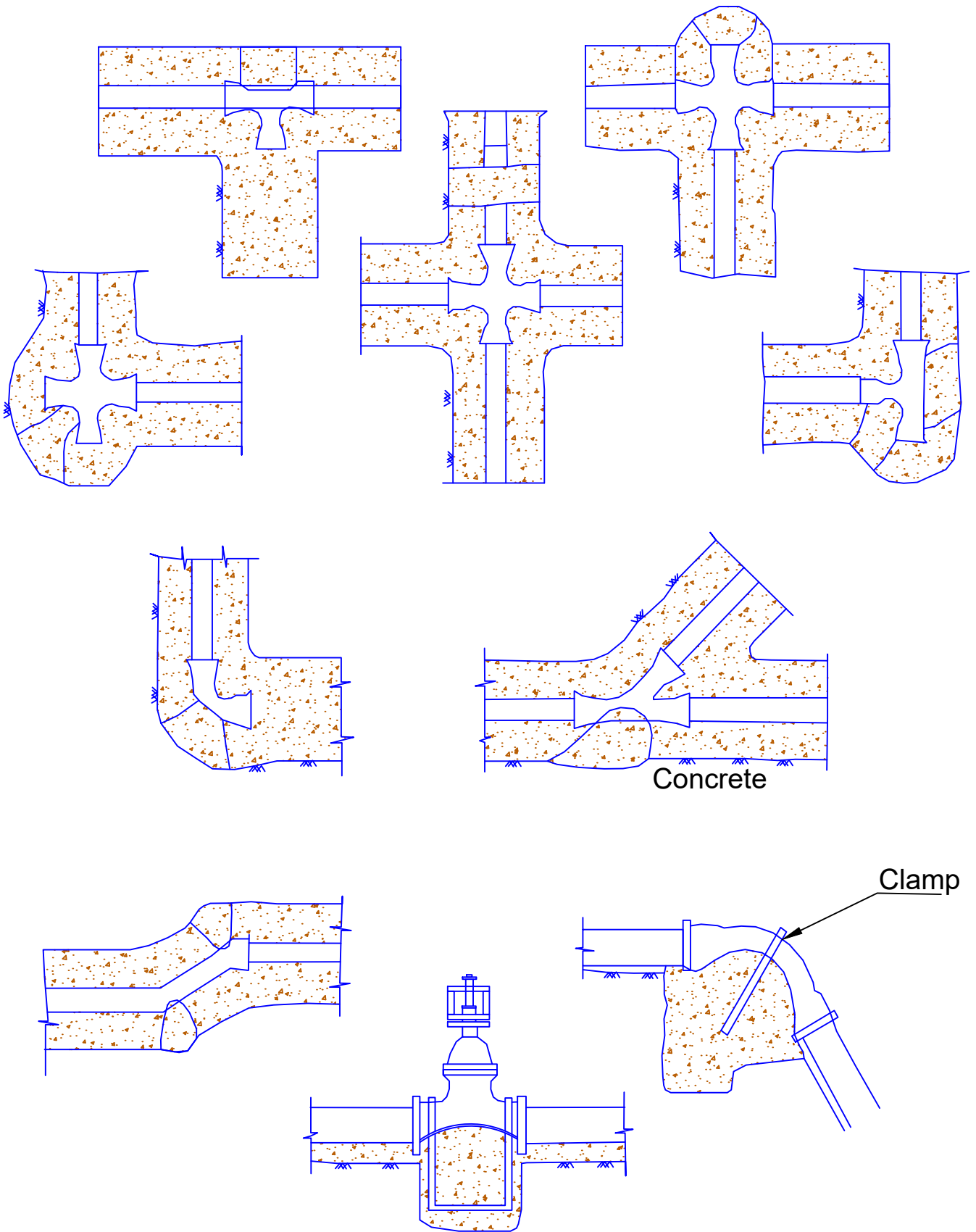


PLAN

1. Drg not to scale
2. All dimensions are in mm
3. Clear cover over reinfor cement shall be 20 mm
4. The slab covers shall cast in r.c.c. 1:1:2
5. The r.c.c. cover shall be properly cured

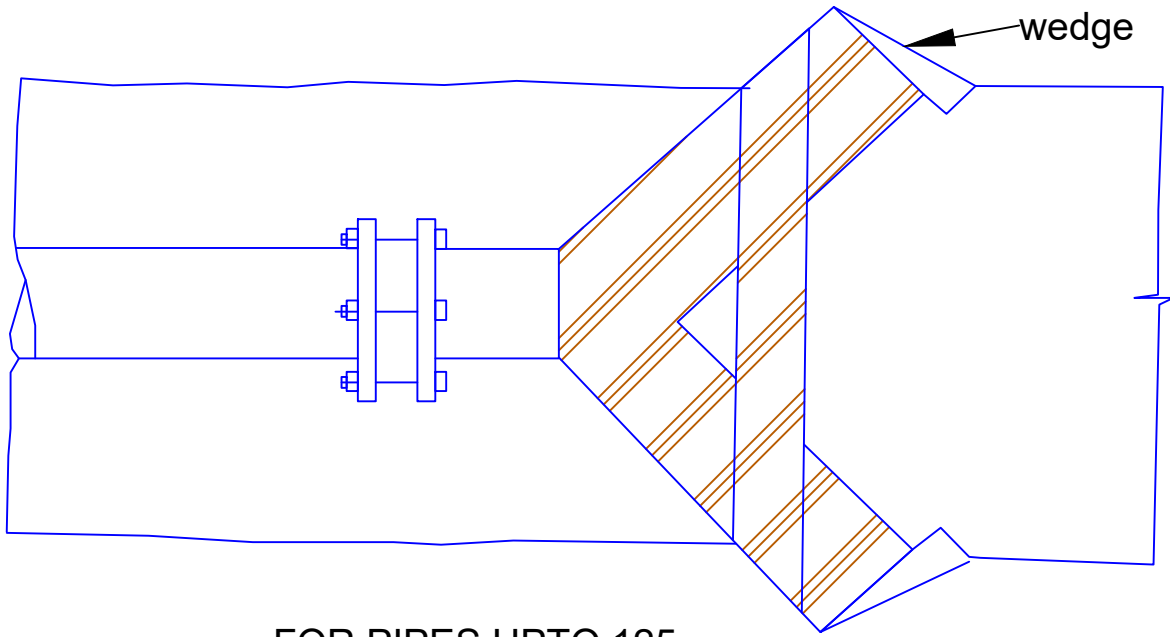
DRAWING NO.19

THRUST BLOCK

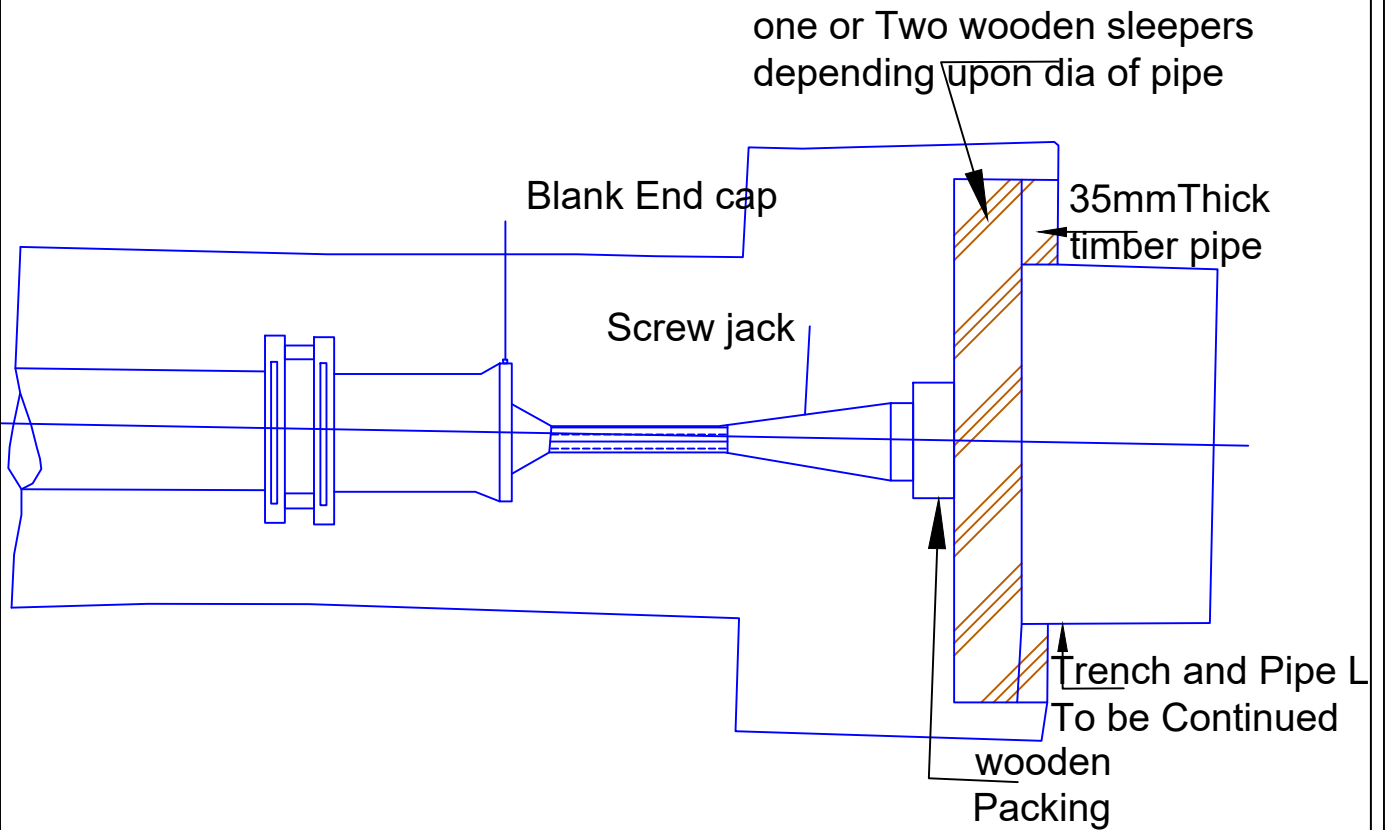


DRAWING NO.20

CLOSURE OF PIPES FOR HYDROSTATIC TEST



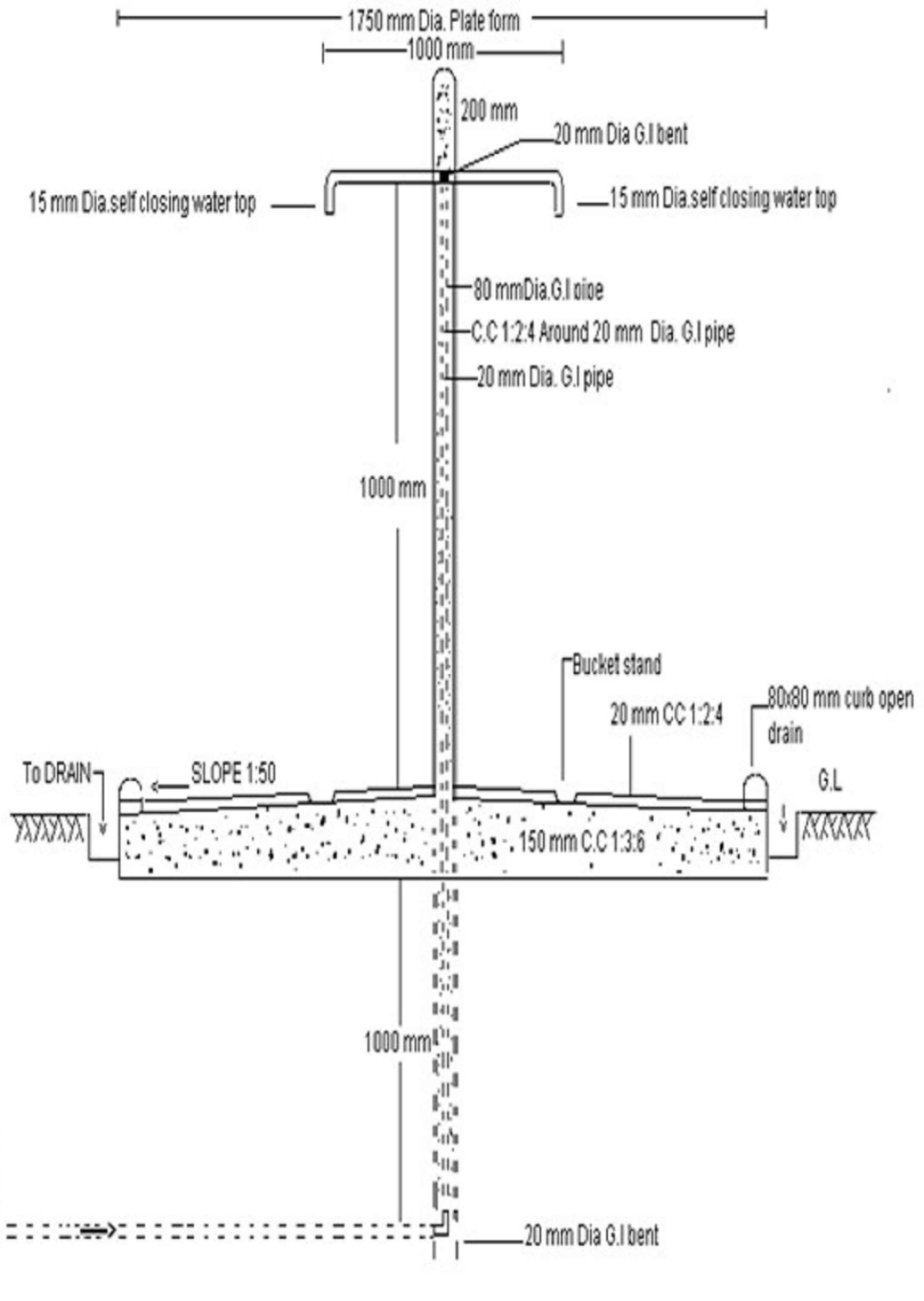
FOR PIPES UPTO 125
NOMINAL DIA



HYDROSTATIC TEST AND CLOSURE FOR PIPES

DRAWING NO.21

TWO TAPS STAND POST IN HARD STRATA

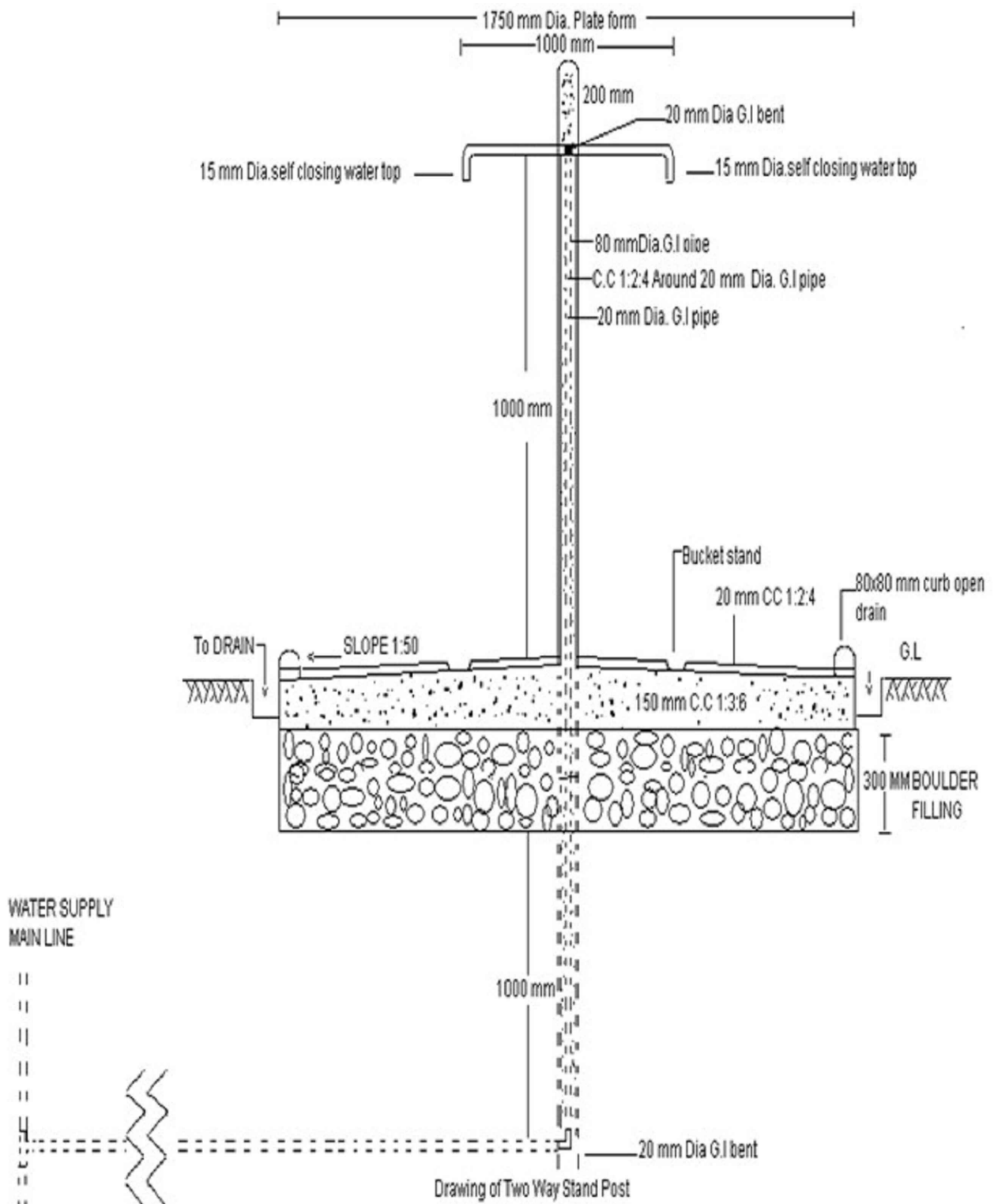


Drawing of Two Way Stand Post

All dimensions are in milimeter

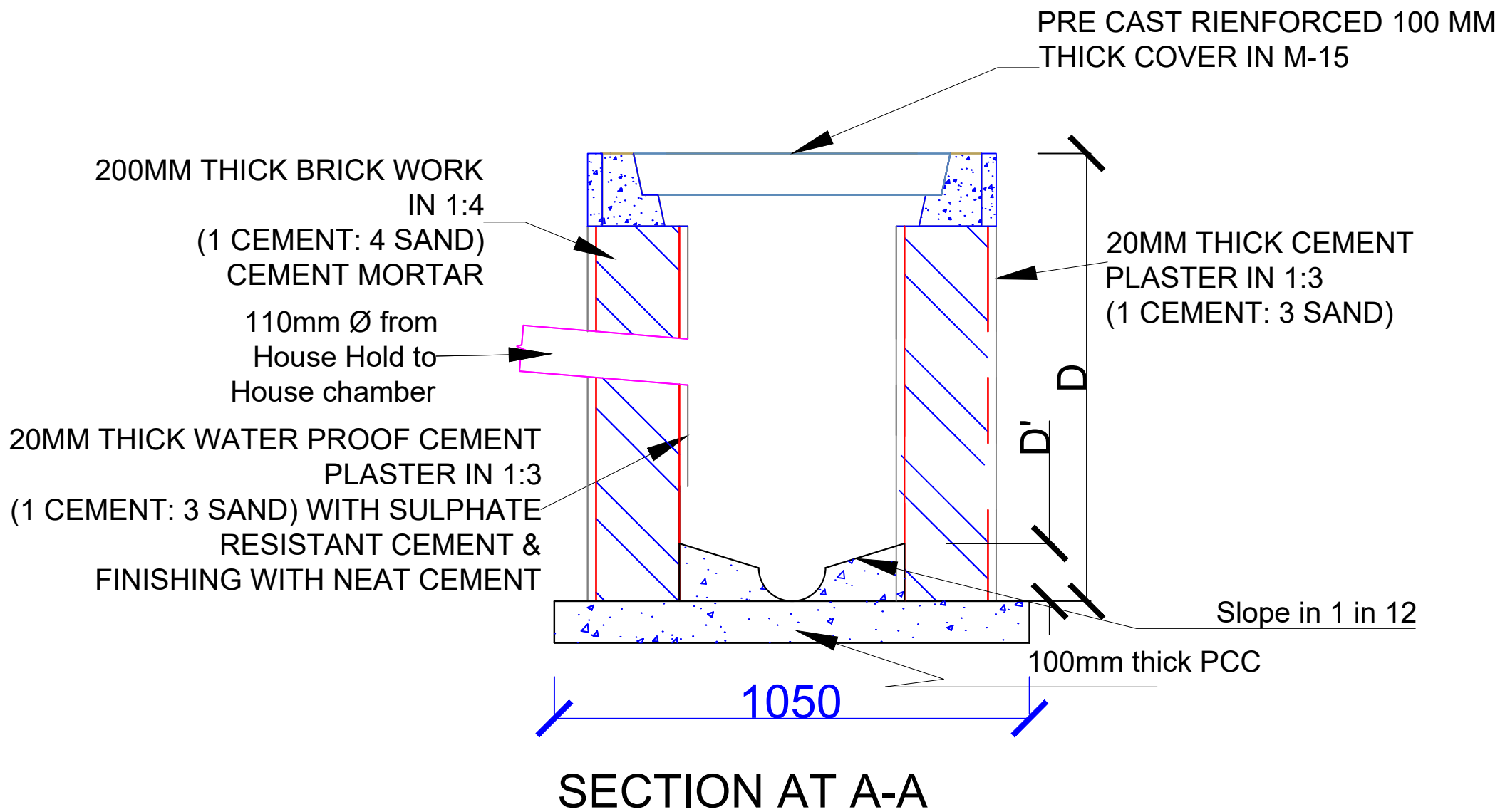
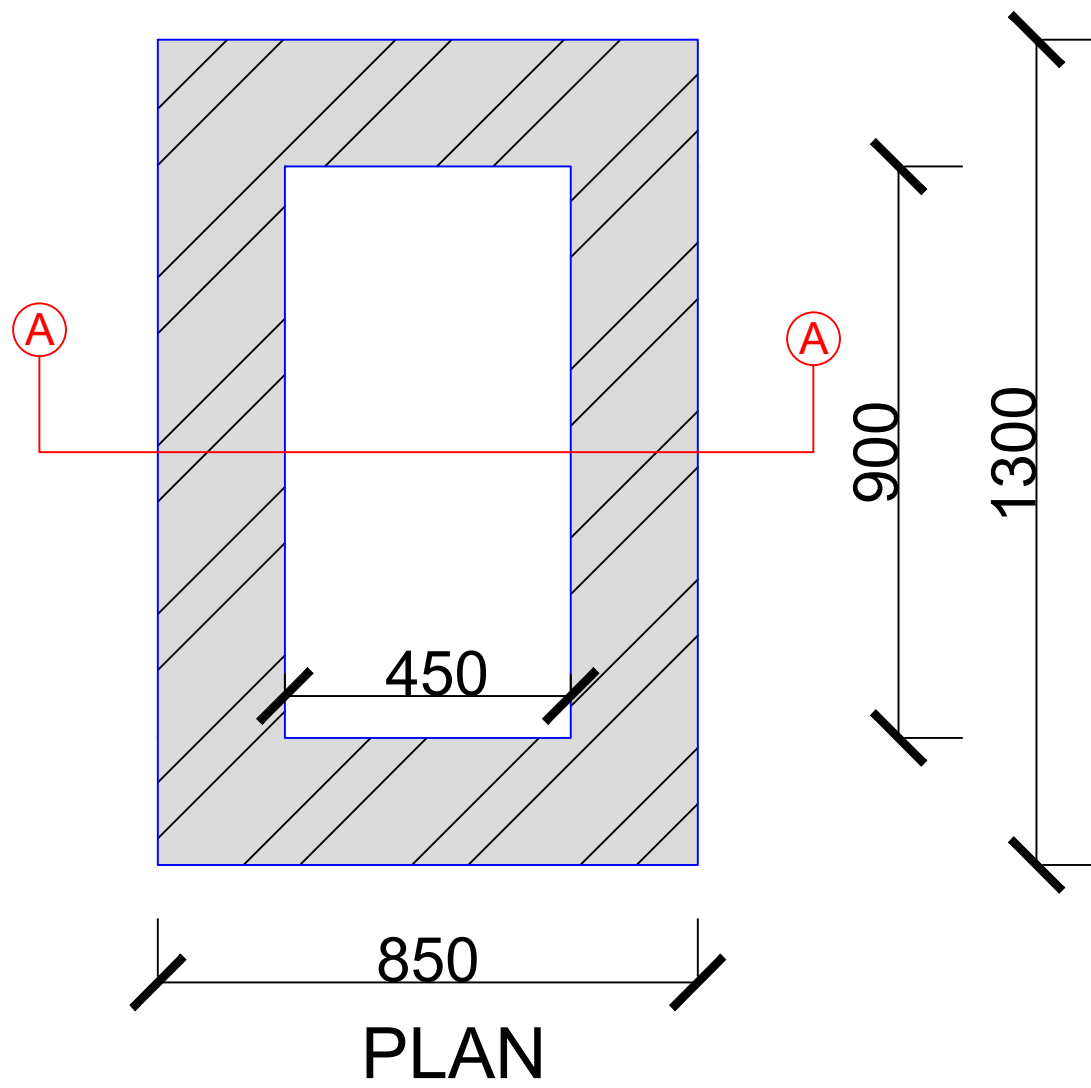
DRAWING NO.22

TWO TAPS STAND POST IN BLACK COTTON SOIL



DRAWING NO.23

HOUSE CHAMBER(900MM X 450MM)

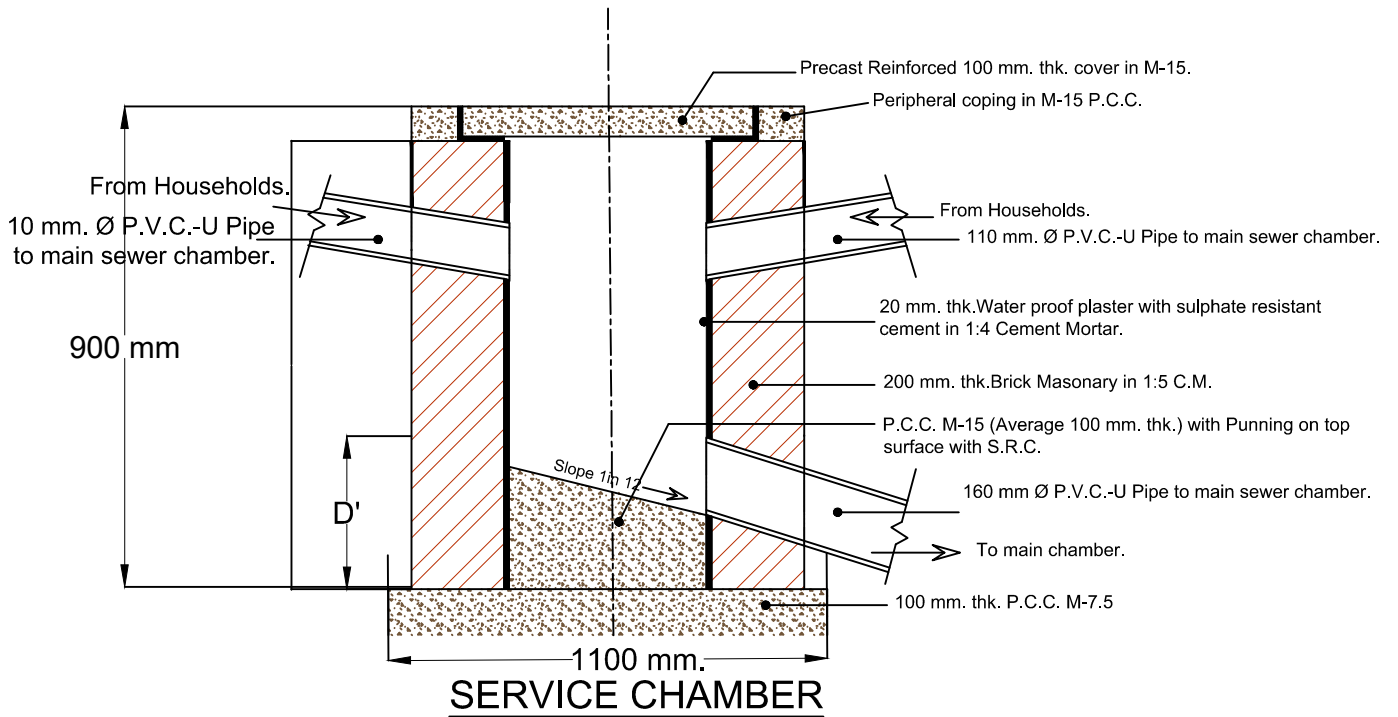


NOTE:-

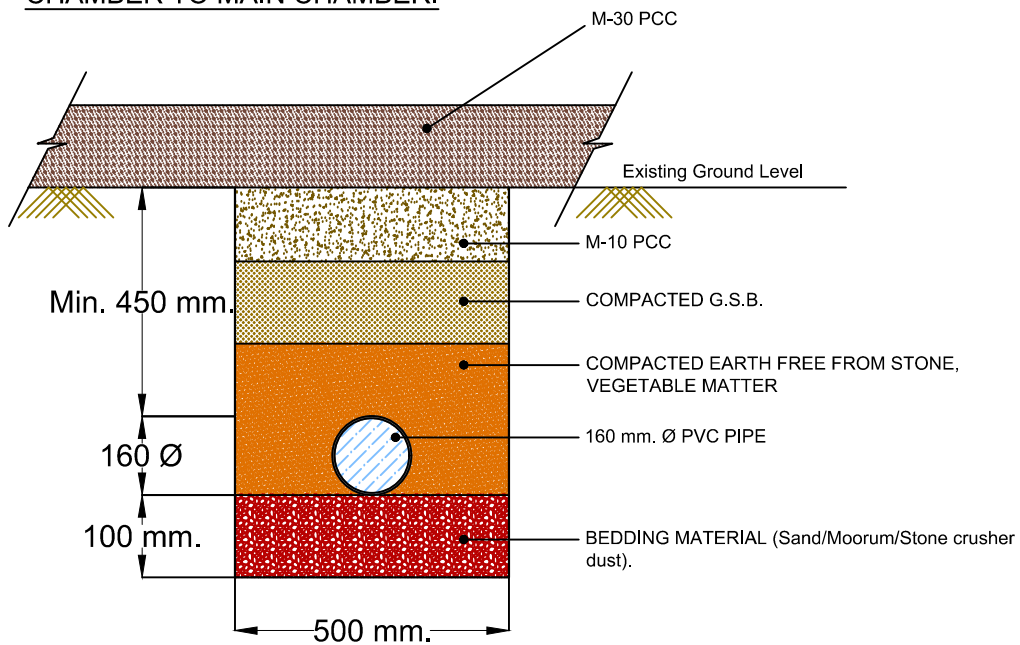
1. All dimensions are in mm
2. Do not scale the drawing
3. D varies from 0.60m
4. D' depends as per site conditions

DRAWING NO.24

HOUSE CHAMBER 450MM X 600 MM



SECTION OF SEWER PIPE TRENCH TO CONNECT SERVICE CHAMBER TO MAIN CHAMBER.

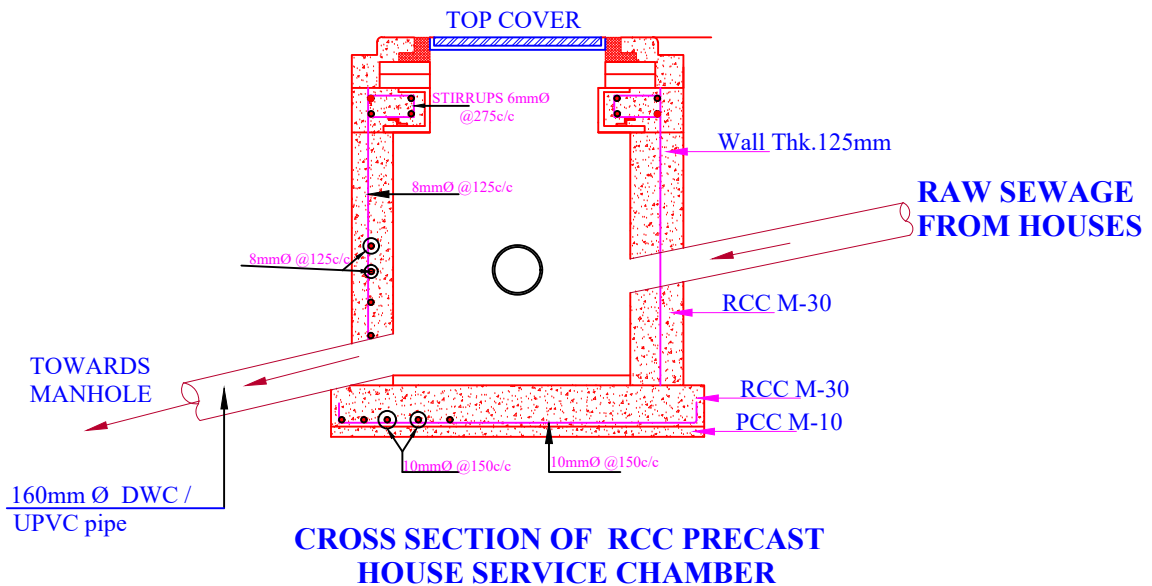
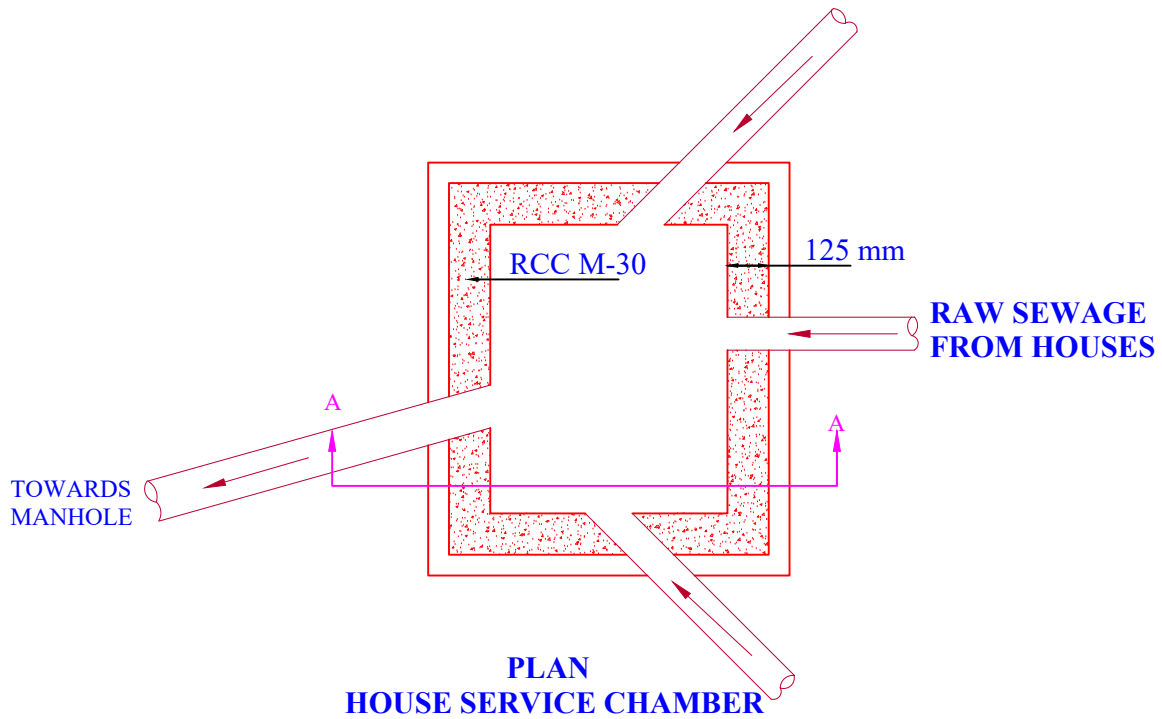


NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

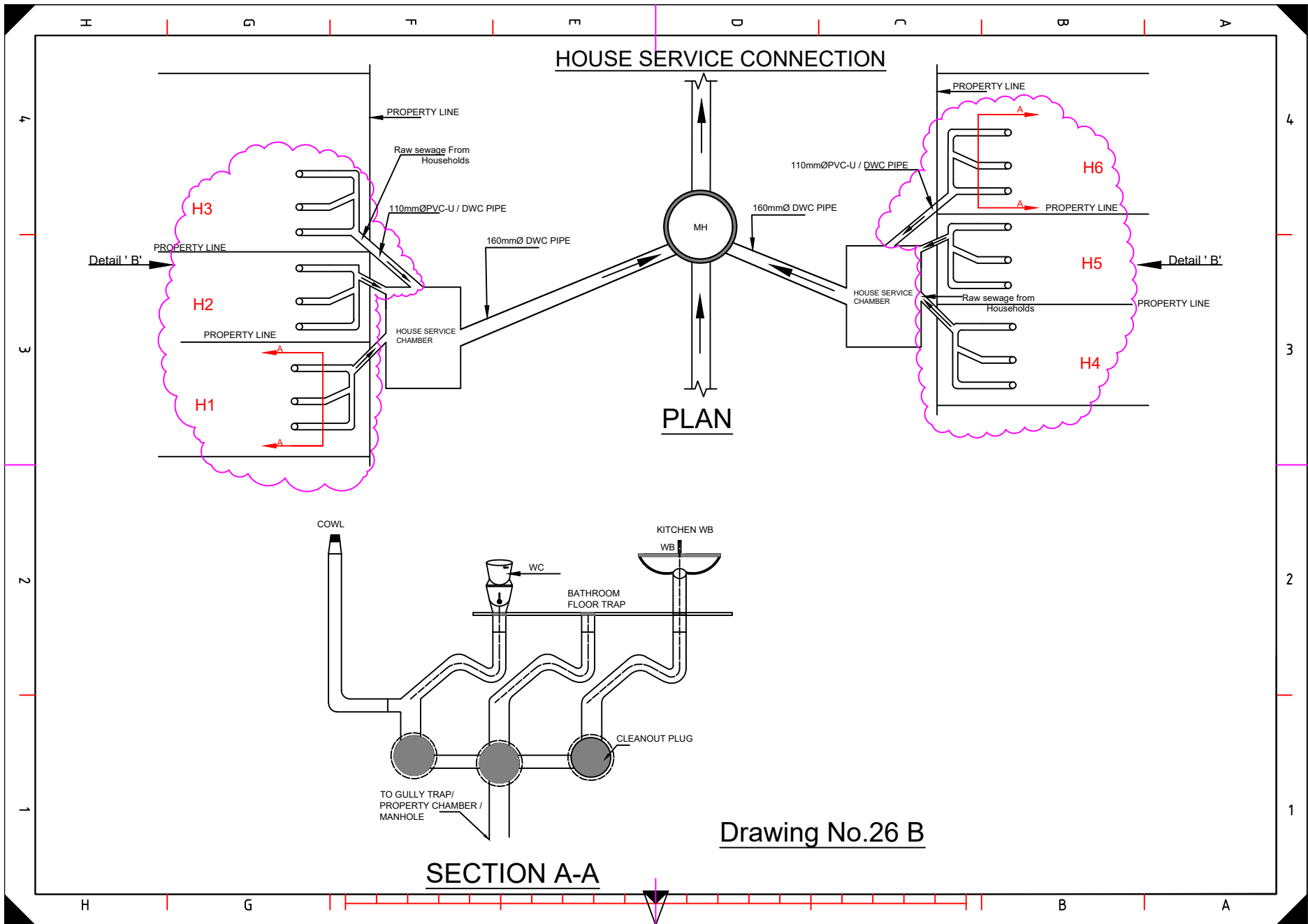
DRAWING NO.25

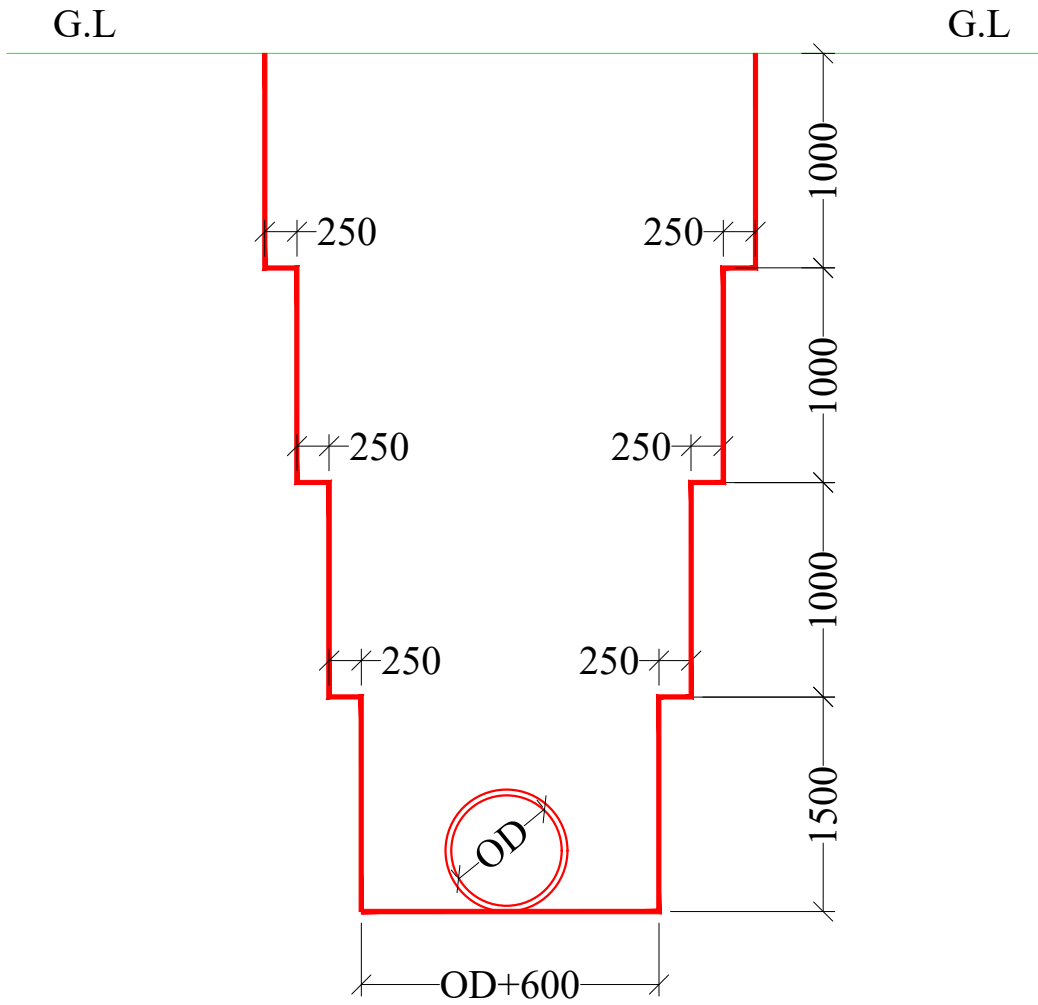
RCC PRE-CAST RECTANGULAR HOUSE SERVICE CHAMBER / ROAD GULLY TRAP CHAMBER



- NOTES:-**
- 1- All dimension are in mm.
 - 2-Do Not Scale The Drawing

DRAWING NO. 26 A





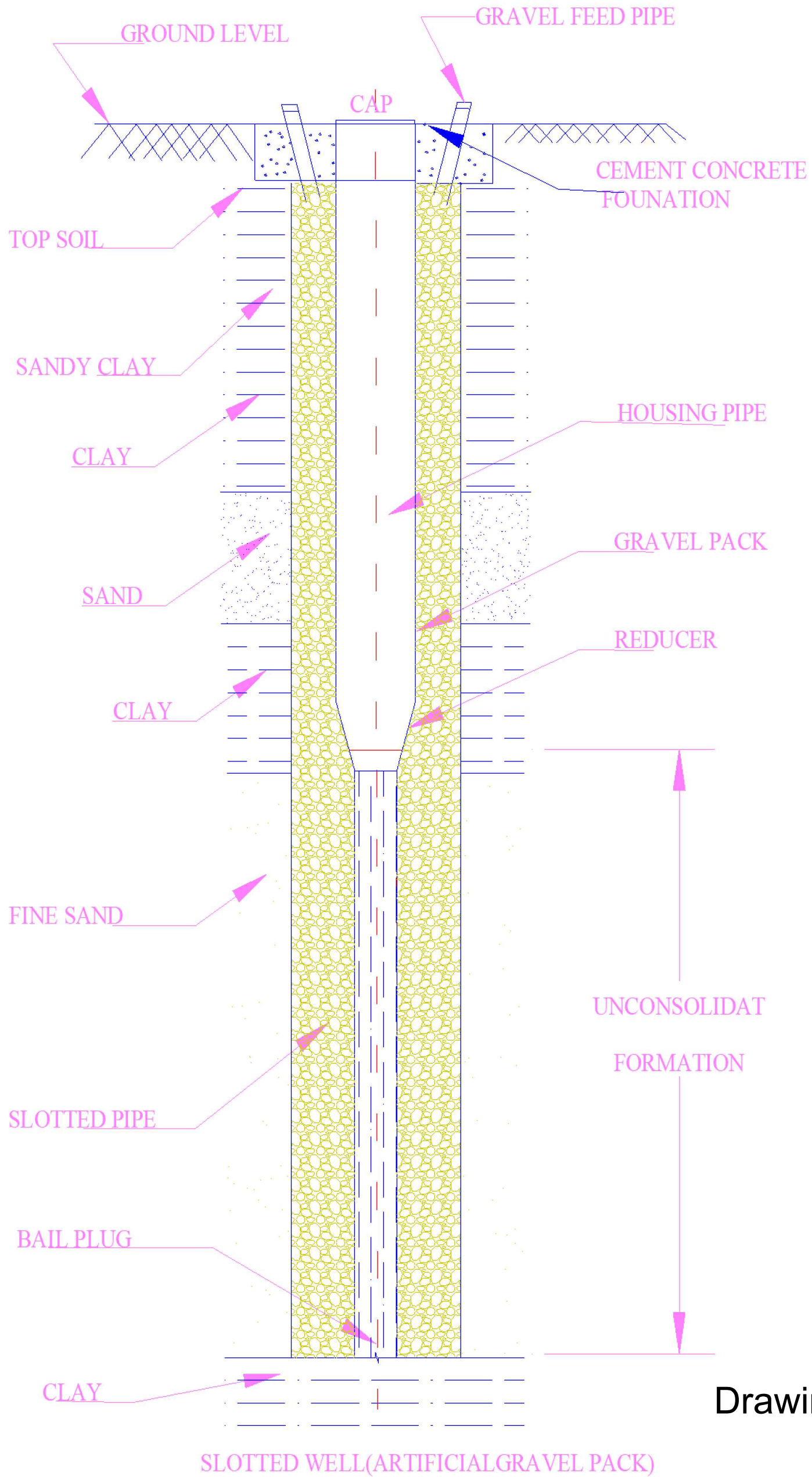
TRENCH SECTION FOR EXCAVATION
OF SEWER/WATER PIPE LINE TRENCH

NOTES:-

1. All dimensions are in mm
2. Do not scale the drawing

DRAWING NO.27

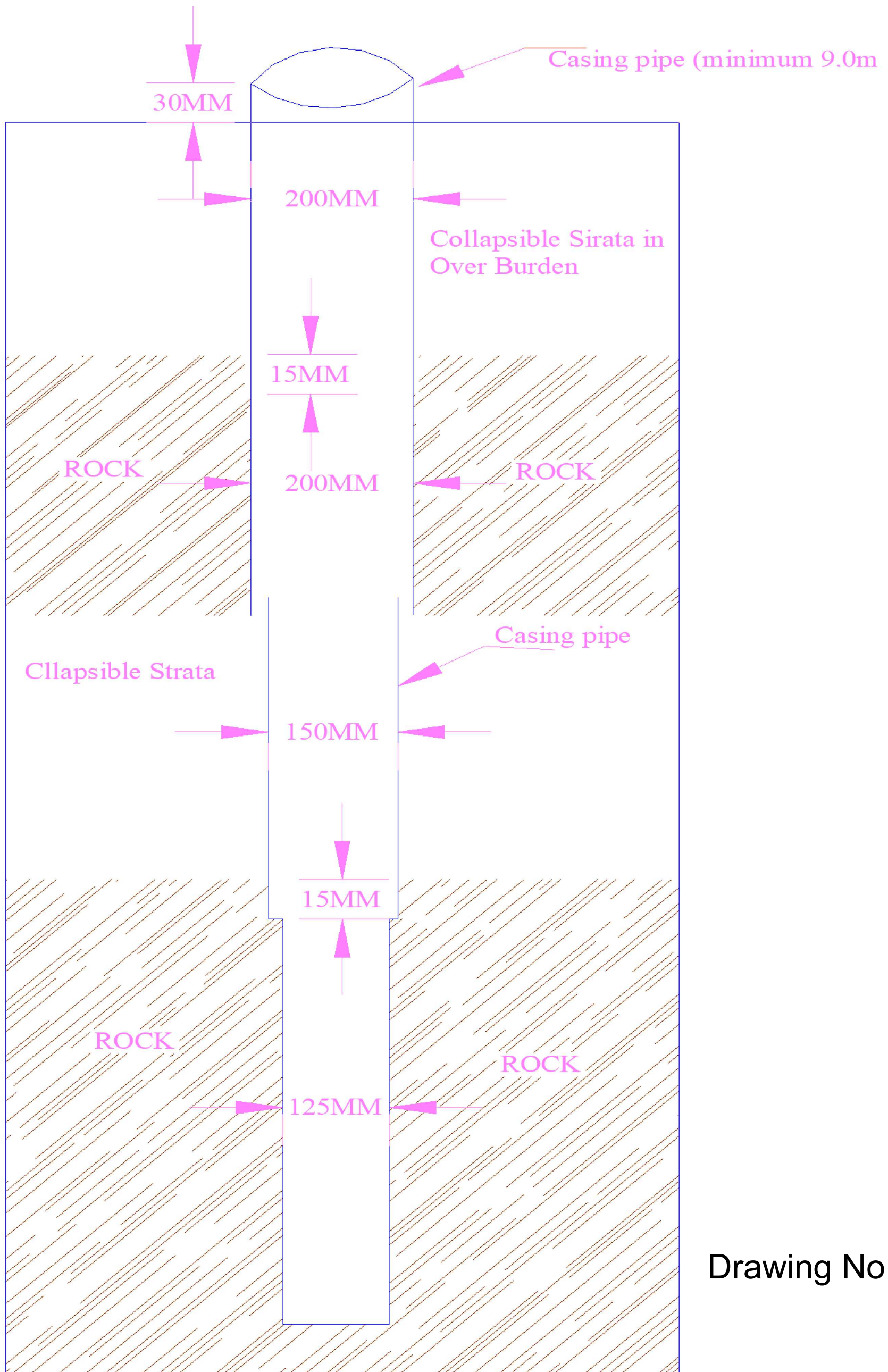
GAVEL PACKED TUBE WELLS



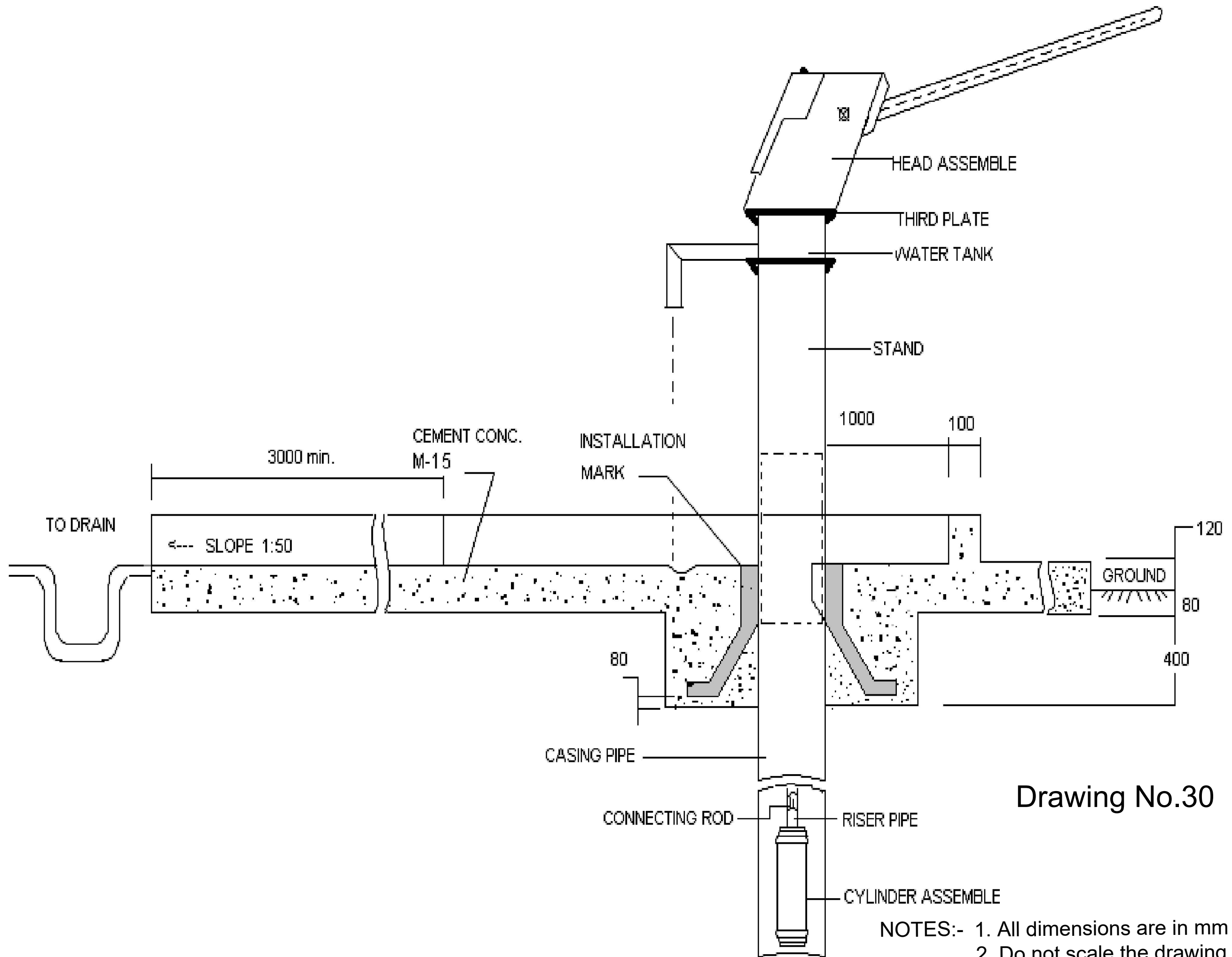
Drawing No.28

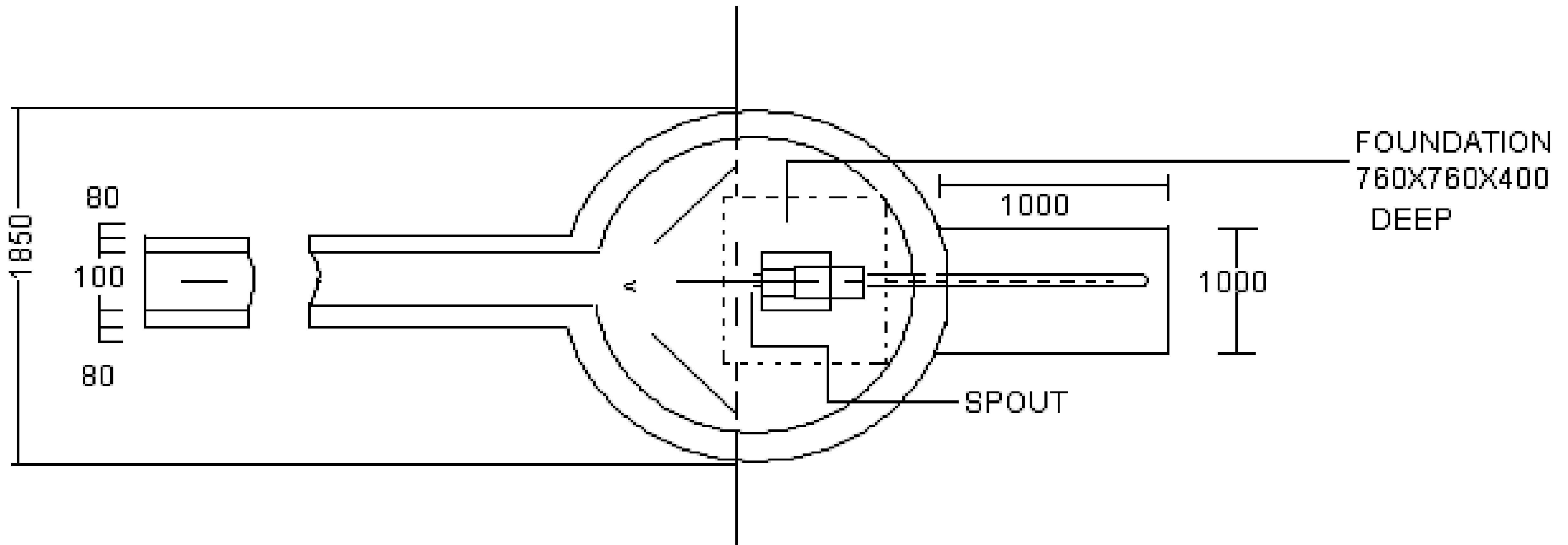
TELESCOPIC TUBE EWLL

200/150 125mm dia



Drawing No.29





All dimensions in millimeters

Figure not to scale

Typical Set-Up For Deepwell Handpump

Drawing No.31