TENDER DOCUMENT

Reorganizaion of Distribution Network of Gudhiyari & Khamtarai areas, Under "SMART CITY MISSION" Raipur (C.G.) – 3rd Call

Tender Number: 51/RSCL/2017-18,

Date: 17-01-2018

Probable Amount of Contract: INR 1612.87 Lakhs

Last Date of Submission: 29-01-2018

Invited by:
Managing Director
Raipur Smart City Limited (RSCL),
Chhatrapati Shivajee Maharaj Outdoor Stadium,
Near Viveknand Sarovar,
Raipur- 492001. Chattishgarh

NIT No. 51/RSCL/2017-18 Dated 17-01-2018

DETAILED NOTICE INVITING TENDER

MD, RSCL invites Online Tenders on behalf of Raipur Smart City Limited in Form "**A**" of CG PWD with special conditions from Class A or above Contractor registered under unified registration system in CG PWD with a valid UIN or Equivalent Registration in any state Govt. Dept. Central Govt. Dept., other Govt. Dept./ undertaking of state/Central Govt. Public undertakings P.S.U. for similar work on Gov CG e-Procurement System **http://eproc.cgstate.gov.in**

Sr. No.	SYSTEM TENDER NO.	Name of work	Probable amount of contract (in lacs)	Earnest money (in lacs)	Time allowed for completion (including rainy season)	Bid Submission fees & Tender document fee	Class of Contractor
1	2	3	4	5	6	7	8
1.		Reorganizaion of distribution network of Gudhiyari & Khamtarai areas, Raipur.	Rs. 1612.87 Lakhs (Rupee Sixteen crore twelve lakhs eighty seven thousand only)	Rs. 8.06 Lakhs (Rupees Eight Lakhs Six thousand only) In the form of FDR/BGDD/ONLINE payable at MANAGING DIRECTOR, RAIPUR SMART CITY LIMITED Raipur	12 Months (twelve months including monsoon season)	Rs10,000.00 (Rupees Ten Thousand only) ONLINE ONLY	In ClassA or above contractor registerd under unified registration system in CG PWD with a valid UIN or Equivalent Registration in any State Government department other Govt. undertaking of state/ CenteralGovt/public Undertakings PSU

1.) In order to participate in the Tenders floated using the e-Procurement System, all contractors/bidders are required to get enrolled on the e-Procurement portal.

2.) the bids submitted online should be signed electronically with a Digital Certificate to establish the identity of the bidder bidding online. The registered contractors may obtain information required to issuance of Digital Certificate from ***e-Procurement System Help Desk,*** **Toll Free No. 18004199140**or through Email ID helpdesk.eproc@cgswan.gov.in

3.) For submitting the bids online, the contractors/bidders are required to make online payment using the electronic payments gateway service Bid Submission Fee as mentioned above the different modes of electronic payments accepted on the e-Procurement System is available and can be viewed online on the e-Procurement Website.

4.) Tender Download, Submit Bid online, EMD and other Documents and other activities will be governed by the time schedules given under **"Date-Time Detail(s)"**.

5.) Physical Submission of Envelope A & Envelope B (EMD & pre-qualification document) EMD in favor of MD, RSCL, Raipur [CG] along with the copy of receipt of submission of electronic payments gateway service bid submission fee will be accepted by Hand delivery or speed post or registry, will be submitted at office of the raipur smart city ltd.

6.) Conditions related to e-Procurement are furnished in Annexure O of Tender document and will overrule other conditions wherever applicable/relevant.

7.) The Bidders has to submit (Upload Scan Copies/fill) his offer/credentials online as required in the Tender in the online templates in relevant Envelopes.

8.) The Bidders may refer Help Manual available online to perform their online activities.

9.) If there is any amendment in the Tender it will be published online only.

MANAGING DIRECTOR
RAIPUR SMART CITY LIMITED,
RAIPUR (C.G.)

Key Dates

S. No	RSCL Stage	Agency Stage	Date	Time
1	BID Start Date		17-01-2018	17:30
2	BID Due Date	Online submission	29-01-2018	17:30
3		Physical Doc Submission End Date	30-01-2018	17:30
4	Technical Bid Opening Date (Scheduled)		31-01-2018	11:00

MANAGING DIRECTOR
RAIPUR SMART CITY LIMITED,
RAIPUR (C.G.)

RAIPUR SMART CITY LIMITED
Raipur (Chhattisgarh)

NIT No. 51/RSCL/2017-18 Dated 17-01-2018.

DETAILED NOTICE INVITING TENDER

MD, RSCL invites Online Tenders on behalf of Raipur Smart City Limited in Form "**A**" of CG PWD with special conditions from Class A OR ABOVE Contractor registered under unified registration system in CG PWD with a valid UIN or Equivalent Registration in any state Govt. Dept. Central Govt. Dept., other Govt. Dept./ undertaking of state/Central Govt. Public undertakings P.S.U. for similar work on Gov CG e-Procurement System **http://eproc.cgstate.gov.in**

Group No.	Name of work	Probable amount of contract (in lacs)	Earnest money (in lacs)	Time allowed for completion (including rainy season)	Bid Submission fees & Tender document fee	Class of Contractor
1	2	3	4	5	6	8
1.	Reorganizaion of distribution network of Gudhiyari&Khamtarai areas, Raipur. I.Providing, laying and jointing, testing & commissioning of Distribution Network of total length 45.5 Km with DI K-7 Pipe with dia. From 100mm to 400mm Details of pipe line as below- a. 100mm dia.-length 35.23 Km b. 150mm dia.-length 4.465 Km c. 200mm dia-length 1.871Km d. 250mm dia.-length 1.03Km e. 300mm dia.-length 1.86 Km f. 350mm dia.-length 0.82 Km g. 400mm dia.- length 0.23 Km	**Rs.** 1612.87 **Lakhs (Rupee Sixteen crore twelve lakhs eighty seven thousand only)**	**Rs. 8.06 Lakhs (Rupee Eight Lakh six Thousand only)** In the form of FDR/BG/DD /Online payable at MANAGING DIRECTOR RAIPUR SMART CITY LIMITED Raipur	**12Months** **(twelve months including monsoon season)**	**Rs10,000.00** **(Rupees Ten Thousand only**) ONLINE ONLY	In Class**A** or above contractor registerd under unified registration system in CG PWD with a valid UIN or Equivalent Registration in any State Government department other Govt. undertaking of state/ CenteralGovt/public Undertakings PSU

	h. MS Pipe for NH/SH-Crossing-casing pipe of 400mm & 300mm Dia. with 10mm thickness along with 100m length. II. Supply, Fixing, Testing & Commissioning of Electromagnetic Flow meter (For Distribution network= 11 nos. with dia. 300 mm and 400 mm) EMF dia. 300 mm -9 nos., dia. 400mm -2 nos. III. Supply, Fixing, Testing & Commissioning of House Service Connection 9,661 nos. (New 8,029 and shifting 1,632=9,619 Connections) (15mm - 9,643 nos., 20mm -13 nos.& 25mm - 5 nos.) without water meter.(Including shifting of Old Connections from Old Pipe line to New Pipe line) . IV. Supply.installation,testing and commissioning of AMR enable waters meters:- 15mm AMR-Multi Jet water meter-11264 nos 20 mm AMR-Multi Jet water meter-21 nos 25mm AMR-Multi Jet water meter-08 nos V. Non SOR Items like MS Specials, Inter connection with existing pipe line, Dismantling of Existing pipes, MS meter box for water meter etc.					

NOTE:

1. Registration and subsequent empanelment for e-tendering website (https://eproc.cgstate.gov.in)and department's sub-portal is mandatory.
2. The tender documents containing detailed terms & conditions are available for free download on GoCG e-Procurement portal (http://eproc.cgstate.gov.in) Bidders have to quote online their prices along with Technical

and Commercial bids in prescribed formats on the above mentioned portal only.

3. The Bidders intending to participate in this Tender are required to get enrolled on the above mentioned website. Enrolment on the above mentioned Portal is mandatory. As the online Bids are required to be digitally signed, Bidders are required to obtain Class – II Digital Signature Certificates (DSCs). the bids submitted online should be signed electronically with a Digital Certificate to establish the identity of the bidder bidding online. The registered contractors may obtain information required to issuance of Digital Certificate from e-Procurement System Help Desk, Toll Free No. 18004199140or through Email ID-helpdesk.eproc@cgswan.gov.in.
4. Validity of offer - 120 days from date of opening of financial offer.
5. No Joint ventures shall be allowed for this tender.
6. The Technical offer shall be opened in presence of the Bidders or their authorized representatives, who may choose to be present. The date of opening of financial offer will be intimated to the Bidders subsequently after opening of technical offer.
7. All the Contractors are required to submit Envelopee 'A' and 'B" physically as well as online(scan copy).

   The Earnest Money deposit will be returned to the unsuccessful tendered after award of contract to the successful bidder.
8. Also the Techical Bid shall be submitted physically but the financial offer shall be submitted online. In all cases the submission which is online shall prevail.
9. Physical Submission of Envelope A & Envelope B (EMD & pre-qualification document) EMD in favor of MD, RSCL, Raipur [CG]
10. Tender Download, Submit Bid online, EMD and other Documents and other activities will be governed by the time schedules given under "Date-Time Detail(s)".
11. The Tender should be accompanied by the following Pre-Qualification Documents duly attested.

1.	Valid Commercial Tax Certificate of Chhattisgarh
2.	Valid registration in appropriate class with unified Registration (Single window) on GoCG PWD e-Procurement Sysytem Portal (https://cgeprocurement.gov.in)
3	**Bid Capacity=(2.5xAxN)-B** Where A= Maximum value of works executed during last 5 years (with 10% compounded rate per year). Where N = Period of completion in years (shown in NIT) Where B = Value of works in hand The bid capacity of contractor/firm/company should be equal or more than the PAC shown in NIT.
4.	**Works Experience-** The contractor should have an experience of Providing and laying, jointing, hydrostatic testing, installation & Commissioning of water supply pipelines of 50 % of largest diameter ie. (400/2=200 mm) of a minimum half of the total length of largest diameter ie. (232/2) meter = 116meter, overall quantity laid of diameter 100mm and above should not be less than half of the desired combined estimated length i.e (45.5/2) KM =22.50 KM in a single contract or in multiple contracts Experience certificate of successful completion of work of the same nature in contractor's/firm's/company's own name indicating agreement no., work order no. and date, amount of contract, stipulated period of completion, actual period of completion during last five years i.e. 2012-2013 to 2016-2017. The certificate should be issued by an officer not below the rank of Executive Engineer and shall be countersigned by the officer not below the rank of Superintending Engineer or equivalent. The experience of the bidder as a contractor who has executed a work sub let a part or whole work will be out-rightly rejected.

5.	The details of works in hand indicating name of work, Agreement no., work order no., and date, amount of contract, period of completion, value of work and balance work in hand with details of work on the date of submission of Tender.
6.	Financial turn over during last Five years i.e. 2012-13 to 2016-17.
7.	List of available tools and plants for successful completion of work.
8.	The tenderer who was blacklisted any where in India in last 05 years or was abondened or asked to stop a running job is not allowed to bid for this tender. The tenderer shall submit an Affidavit in this regards.
	The Department reserves the right to change the Key dates of the Tender Process.

Endt. No...../2017-18

MANAGING DIRECTOR
RAIPUR SMART CITY LIMITED
Raipur, Chhattisgarh

Raipur/Dated:

Copy forwarded to:-

1. .....
2. .....
3. Notice Board.

MANAGING DIRECTOR
RAIPUR SMART CITY LIMITED
Raipur, Chhattisgarh

FINANCIAL PREQUALIFICATION AS PER LATEST NORMS
To qualify in the Tender each Tenderer must have in last Five years

Sl. No	Description	Supporting Documents
	Cost of Package – Rs1612.87 lakhs	
1	Achieved in **'any one financial year'** a financial turnover (in all classes of construction works related to Water supply works) value of construction work of at least **60% (Sixty percent)** the amount equal to the probable amount of contract for which bid has been invited. **AND**	A copy of turn over statement duly certified by the CA
2	Satisfactorily Completed at least one similar work equal in value 40% (forty percent) of the Probable amount of contract as on date of submission of financial offer. **OR**	Work Order and Completion certificate/ Certificate should be issued/certified/signed by at least Officer of Executive Engineer/Project head level.
3	Satisfactory Completed at least two similar works total costing equal to value 40% (forty percent) of the probable amount of contract for which the tender is invited as on date of submission of financial offer. **OR,**	Work Order and Completion certificate Certificate should be issued/certified/signed by at least Officer of Executive Engineer/Project head level.
4	Satisfactorily executed (atleast 60% of the said contract) at least one similar work having received payment of value not less than 40% (forty percent) OR two similar works having received aggregate payment of value not less than 40% (forty percent) of the value of probable amount of contract as on date of submission of financial offer.**OR**	Work Order and Completion or performance certificate. Certificate should be issued/certified/signed by at least Officer of Executive Engineer/Project head level.
5	The value of completed work shall be updated to the value of current financial year and compounded rate of 10% (Ten Percent) per year from completion year of work	
.Note: Similar work means **Design, Laying, testing and commissioning of water supply Pipeline Network**		

NOTE:

(1) The turn over shall be indexed at the compounded rate of 10% (Ten percent) for earlier years.
(2) The value of completed work shall be updated to the value of current financial year @ compounded rate of 10% (Ten percent) per year from completion year of work

Other condition including qualification and details of work can be seen in the office of the undersigned during office hours and downloaded online directly from the portal (http:/eproc.cgstate.gov.in) through Urban administration & Development Department sub portal and shall be submitted online on or before **29/01/2018 up to 17:30 P.M**. This NIT shall also form the part of agreement. The details can be viewed on the website http://eproc.cgstate.gov.in **from 17/01/2018, 17:31 PM onwards.**

MANAGING DIRECTOR
RAIPUR SMART CITY LIMITED
Raipur, Chhattisgarh

1.0 "INSTRUCTIONS FOR USING THE ELECTRONIC TENDERING SYSTEM'

For details on tendering procedure through the electronic tendering system, please refer to "instructions for using the electronic tendering system' document available along with the tender documents.

The Bidders are also invited to get themselves trained on the operations of the e-Procurement System. Bidders may get in touch with the Service Provider of the e-Procurement System for confirming the time and date for their training session.

Payment for Service Provider Fees: In addition to the Tender Document Fees payable to MANAGING DIRECTORRSCL, RAIPUR, the Contractors will have to pay Service Providers Fees of Rs. ……through online payments gateway service available on Electronic Tendering System. For the list of options for making online payments, the Contractors are advised to visit the link E-Payment Options under the section E-Tendering Toolkit for Bidders on the Home Page of the Electronic Tendering System

Steps to be followed by Contractors to participate in the e-Tenders

I. Registration in appropriate Class in Unified Registration (Single Window) System on **https://eproc.cgsstate.gov.in** and subsequent empanelment for e-tendering website https://eproc.cgsstate.gov.in and department's sub-portal is mandatory.

II. **Online viewing of Detailed Notice Inviting Tenders:**

The Contractors can view the Detailed Tender Notice along with the Time Schedule (Key Dates) for all the Live Tenders on the Portal (https://eproc.cgsstate.gov.in) and https://smartcityraipur.org

III. **Download of Tender Documents:**

The Pre-qualification / Main Bidding Documents are available for free downloading. However to participate in the online tender, the bidder must deposit Bid Processing and tender document fee online by fillingup details of Demand Draft.

IV. **Online Bid Preparation and Submission of Bid Hash (Seal) of Bids**:

Submission of Bids will be preceded by online bid preparation and submission of the digitally signed Bid Hashes (Seals) within the Tender Time Schedule (Key Dates) published in the Detailed Notice Inviting Tender. The Bid Data is to be prepared in the templates provided. The templates may be either form based, extensible tables and / or uploadable documents. In the form based type of templates and extensible table type of templates, the Contractors are required to enter the data and encrypt the data using the Digital Certificate.

In the uploadable document type of templates, the Contractors are required to select the relevant document / compressed file (containing multiple documents) already uploaded in the briefcase.

Notes:

a. The Contractors upload a single document or a compressed file containing multiple documents against each unloadable option.

b. The Hashes are the thumbprint of electronic data and are based on one – way algorithm. The Hashes establish the unique identity of Bid Data.

c. The bid hash values are digitally signed using valid Digital Certificate issued any Certifying Authority. The Contractors are required to obtain Digital Certificate in advance.

d. After the hash value of bid data is generated, the Contractors cannot make any change / addition in its bid data. The bidder may modify bids before the deadline for Bid Preparation and Hash Submission as per Time Schedule mentioned in the Tender documents.

V. **Close for Bidding (Generation of Super Hash Values):**

After the expiry of the cut – off time of Bid Preparation and Hash Submission stage to be completed by the Contractors has lapsed, the Tender will be closed by the Tender Authority. Tender Authority shall generate and digitally sign the Super Hash

VI. Decryption and Re-encryption of Bids (submitting the Bids online):

After the time for generation of Super Hash values by the Tender Authority has lapsed, the Contractors have to make the online payment towards the fees of the Service Provider.

After making online payment towards Fees of Service Provider, the Contractors are required to decrypt their bid data using their Digital Certificate and immediately re-encrypt their bid data using the Public Key of the Tendering Authority. The Public Key of the Tendering Authority is attached to the Tender during the Close for bidding stage.

Note: The details of the Processing Fees shall be verified and matched during the Technical Opening stage.

At this time, the Contractors are also required to upload the files for which they generated the Hash values during the Bid Preparation and Hash Submission stage.

The Bid Data and Documents of only those Contractors who have submitted their Bid Hashes (Seals) within the stipulated time (as per the Tender Time Schedule), will be available for decryption and re-encryption and to upload the relevant documents from Briefcase. A Contractor who has not submitted his Bid Preparation and Hash Submission stage within the stipulated time will not be allowed to decrypt / re-encrypt the Bid data / submit documents during the stage of Decryption and Re-encryption of Bids (submitting the Bids online).

VII. **Documents Comprising the Bid**

A. **Technical Bid** – (**Envelopee 'A'**)

1) Letter of EMD
2) EMD---A Scanned Copy (for online submission)of FDR/BG/DD/RTGS receipt drawn in favour of "**MANAGING DIRECTOR RAIPUR Smart City Limited**" payable at "**RAIPUR**" towards Earnest Money Deposit as specified in the Notice Inviting Bid. Original to be submitted physically.
3) Scanned Copy of Pre-Contract Integrity Pact duly Signed (On Rs. 100 Non judicial stamp Paper, duly Notarized)

B. Pre**-Qualification Details** (**Envelopee 'B'**) (should be submitted physically duly signed and scanned copy of it should uploaded online)

a) Registration in appropriate Class In Unified Registration System (Single Window) on GoCG PWD e-Procurement System Portal of Chhattisgarh (https://cgeprocurement.gov.in) through sub portal https://uadd.cgeprocurement.gov.in
b) Valid Commercial Tax Certificate of Chhattisgarh
c) Experience certificate of successful completion ofwork of similar integrated work in last 05 years i. e., 2012-13 to 2016-17 as indicated in Technical PQ criteria.

d) Scanned copy of ESIC Certificate/otherwise if not applicable submit affidavit in the format given in this Tender on Rs 100/- Non-Judicial stamp paper, duly Notarized.
e) Copy of registration with Commissioner PF / if not applicable, submit Affidavit.
f) Cashless Payment to Employees(affidavit)
g) Details of work in hand with their value.
h) Financial Turn Over for the last **5 years** (upto 31/3/2017) certified by a Chartered Accountant.
i) ITR of last 05 years & PAN Card, TIN No.
j) List of Tools & Plants available with bidder
k) Power of Attorney/Letter of authorization to sign the bid
l) Partnership deed /MOA of company
m) Declaration for NOT BEING BLACKLISTED
n) BID CAPACITY
o) Undertaking for validity of bid for 120 days.
p) Appendix '1' Qualification Information
q) Appendix '2' Experience of similar nature of work
r) Appendix '3' List of other construction work
s) Appendix '4' Existing Commitments
t) Appendix '5' Machinery available with the tenderer
u) Appendix '6' Technical Personnel available with the tenderer
v) Appendix '7' Financial report
w) Appendix '8' Current claims and arbitration
x) Appendix '9' List of plants and machinery required
y) Appendix '10' List of plants and machinery to be deployed
z) Appendix '11' List of personnel to be deployed (qualification of technical personnel)
aa) Appendix '12' Contact persons (Clients for whom the work has been carried out by the bidder)

y) Appendix '13' Affidavit

Note: all the physical documents to be sent at the mailing address:

MANAGING DIRECTOR, RAIPUR SMART CITY LIMITED, OPP. VIVEKANAD SAROVAR, OUTDOOR STADIUM, BUDHAPARA, RAIPUR-492001, Through speed post /regesterd post only.

C. **ENVELOPEE – C** (for online submission only)

This Envelopee shall contain only percentage rate offer above or below SOR. The tenderer shall have to duly fill their offer in appropriate online form meant for it. If financial bid found in hard copy the bidders bid shall deemed to be rejected.

Tendring schedule

S.No	Events Description	Dates
1	Downloading of RFP documents through Website	17-01-2018
2	Last date of online submission of proposal	29-01-2018 @ 17:30
3	Last date of submission of original documentsfor tender fee, EMD & Hard Copy of uploaded technical bid & such other documents as mentioned in RFP	30-01-2018 @ 17:30
4	Technical Bid opening date	31-01-2018 @ 11:00
5	Financial Bid opening date	To be declared

VIII. **Bid Opening and Evaluation**

Bid Opening

(1) The RAIPUR SMART CITY LIMITED RAIPUR will open the bids received (except those received late). In the event of the specified date for the submission of bids being declared a holiday for RAIPUR SMART CITY LIMITED RAIPUR, the Bids will be opened at the appointed time and location on the next working day.

(2) The files containing the technical bid shall be opened. The document marked “cost of bidding document” will be opened first and if the cost of the bidding documents is not there, or incomplete, the remaining bid documents will not be opened, and bid will be rejected.

(3) In all other cases, the amount of Earnest Money, forms and validity shall be announced. Thereafter, the bidders' names and such other details as the RAIPUR SMART CITY LIMITED RAIPUR may consider appropriate, will be announced by the RAIPUR SMART CITY LIMITED RAIPUR at the opening.

(4) The RAIPUR SMART CITY LIMITED RAIPUR will prepare minutes of the Bid opening, including the information disclosed to those present in accordance with relevant Clause of ITB.

(5) Evaluation of the technical bids with respect to bid security, qualification information and other information furnished in Par t I of the bid in pursuant to relevant Clause of ITB, shall be taken up and completed and a list will be drawn up of the responsive bids whose financial bids are eligible for consideration.

(6) The RAIPUR SMART CITY LIMITED RAIPUR shall inform, by email, telegram or fascimal, the bidders, whose technical bids are found responsive, date, time and place of opening as stated in the Notice Inviting Bid.

In the event of the specified date being declared a holiday for the RAIPUR SMART CITY LIMITED RAIPUR , the bids will be opened at the appointed time and location on the next working day through they or their representative, may attend the meeting of opening of financial bids.

(7) At the time of the opening of the 'Financial Bid',(Envelopee ‘C’) the names of the bidders whose bids were found responsive in accordance with relevant clause of ITB will be announced. The financial bids of only these bidders will be opened. The responsive bidders' names, the Bid prices, the total amount of each bid, and such other details as the RAIPUR SMART CITY LIMITED RAIPUR may consider appropriate will be announced by the RAIPUR SMART CITY LIMITED RAIPUR at the time of bid opening.

(8) Process to be Confidential Information relating to the examination, clarification, evaluation, and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any attempt by a Bidder to influence the RAIPUR SMART CITY LIMITED RAIPUR’s processing of bids or award decisions may result in the rejection of his Bid

(9) Clarification of Bids and Contacting the RAIPUR SMART CITY LIMITED RAIPUR

(10) No Bidder shall contact the RAIPUR SMART CITY LIMITED RAIPUR on any matter relating to its bid from the time of the bid opening to the time the contract is awarded.

(11) Any attempt by the bidder to influence the RAIPUR SMART CITY LIMITED RAIPUR’s bid evaluation, by any means, bid evaluation, bid comparison or contract award decision may result in the rejection of his bid.

IX. **Examination of Bids and Determination of Responsiveness**

1) During the detailed evaluation of "Technical Bids"(**Envelopee 'B'**), the RSCLRAIPUR will determine whether each Bid
   (a) meets the eligibility criteria defined relevant Clauses.
   (b) has been properly signed;
   (c) is accompanied by the required securities; and
   (d) is substantially responsive to the requirements of the bidding documents.
   During the detailed evaluation of the "Financial Bids"(Envelopee 'C'), the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications and drawings.

2) A substantially responsive "Financial Bid" is one, which conforms to all theterms, conditions, and specifications of the bidding documents, without material deviation or reservation. A material deviation or reservation is one
   (a) which affects in any substantial way the scope, quality, or performance of the Works;
   (b) which limits in any substantial way, inconsistent with the bidding documents, the RAIPUR SMART CITY LIMITED RAIPUR 's rights or the Bidder's obligations under the Contract; or
   (c) Whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

3) If a "Financial Bid"(Envelopee 'C') is not substantially responsive, it will be rejected by the RAIPUR SMART CITY LIMITED RAIPUR, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

X. **Corrections of Errors**

(1) Bids determined to be substantially responsive, will be checked by the RAIPUR SMART CITY LIMITED RAIPUR for any arithmetic errors. Errors will be corrected by the RAIPUR SMART CITY LIMITED RAIPUR as follows:

Where there is a discrepancy between the rates in figures and in words, the rate in words will govern; and b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

(2) The amount stated in the Bid will be adjusted by the RAIPUR SMART CITY LIMITED RAIPUR in accordance with the above procedure for the correction of errors and shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount, the Bid will be rejected, and the Earnest money shall be forfeited in accordance with relevant Clause of ITB.

XI. **Evaluation and Comparison of Bids**

(1) The RAIPUR SMART CITY LIMITED RAIPUR will evaluate and compare only the bids determined to be substantially responsive in accordance with relevant Clause of ITB.

(2) In evaluating the bids, the RAIPUR SMART CITY LIMITED, RAIPUR will determine for each Bid the evaluated Bid price by adjusting the Bid price by making correction, if any, for errors pursuant to relevant Clause of ITB.

(3) If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate/PAC of the cost of work to be performed under the contract, the RAIPUR SMART CITY LIMITED RAIPUR may require the Bidder to produce detailed price analysis for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed.

After evaluation of the price analyses, the RAIPUR SMART CITY LIMITEDRAIPUR may require that

the amount of the performance security set forth in relevant Clause of ITB be increased as described in relevant clause.

2.0 **R A T E S :**

2.1 The schedule of items :-
The schedule of main items of work to be executed is enclosed as Annexure (F)

2.2 Percentage rate tender in Form 'A' or 'C'

2.3 In respect of percentage rate tenders, contractor should quote his separate tender percentage rate above or below the following schedules of rate 'Unified schedule of rates (Part-I) for water supply, sewerage works issued by Engineer-in-Chief, PHED, RaipurChaattisgarh in force from 07.02.2013 with up to date amendments.''The S.O.R. for building works issued by Engineer-in-Chief P.W.D. Raipur in force from 01.06.2009 for and adopted by Engineer-in-Chief, P.H.E.D., C.G. vide his letter no. 156/Estt dated 19.08.2009 with all amendment issued up to date applicable from 01.01.2015 of issue of N.I.T.' The percentage above / below shall be applicable on items of work of PHED SOR & PWD SOR. On rates given based on analysis of rates or any other SOR or non-SOR rates, the percentage above / below SOR shall not be applicable and payment shall be made at rates given in schedule of quantities.

2.4 (For Form 'A' only) The percentage of tender above/below or as per with the relevant schedule rates inclusive of amendments and correction slips issued up to the date of the notice inviting tenders should be expressed on the tender form itself both in words and figures in such a way that interpolation is not possible and all over writings should be neatly scored out and rewritten and the corrections should be duly attested prior to the submission of tender. Tenders not specifying percentage in words will summarily be rejected. Any amendments to the schedule of rates after the date of issue of this tender notice or the date of issue of any amendments to the N.I.T., specifically notifying the said amendment to the current schedule of rates, shall not apply to this tender.

2.5 The percentage tendered by the contractor will apply to those rates which find place in the current schedule of rates, or have been derived from the said current schedule of rates and not to other items of work.

2.6 The percentage quoted by the contractor shall not be altered by the contractor during the terms of contract. The deduction or addition as the case may be of the percentage will be calculated on the amount of the bill for the work done, after deducting the cost of materials supplied departmentally at rates specified in the agreement.

2.7 The rates quoted in the tender for various items of work will not be altered by the contractor during the term of contract.

2.8 LEAD AND LIFT OF WATER - No lead and lift for carting of water will be paid.

2.9 LEAD AND LIFT OF MATERIALS - No lead and lift for carting of materials shall be payable to the contractor except in case of such items for which specific lead and lift are provided in the current schedule of rates mentioned in the schedule of items in respect of item rate tenders.

2.10 NON SCHEDULE ITEMS OF WORKS - During the execution of the work there is likelihood of such items of work, which do' not find place in the current schedule of rates, referred to above in respect of percentage rate contracts or such items which are given in the schedule of items in respect of item rate contracts, for which contractor has not quoted his rates. Contractor will have to carry out these items of work.

2.11 Rates of such items of work which do not find place in the current schedule of rate referred to above, in respect of percentage rate contracts or such items in respect of item rates contracts shall be decided by the MANAGING DIRECTOR, RAIPUR SMART CITY LIMITED, Raipur and the decision of the MANAGING DIRECTOR, RAIPUR SMART CITY LIMITED, Raipur shall be binding on the contractor. The quantum of

such work will not exceed 10% of amount of contract unless accepted by the department and the contractor.

3.0 SUBMISSION OF TENDER :-

3.1 The Earnest money which is to be submitted in Envelopee - A where it should be clearly written on the Envelopee as under :-

ENVELOPEE - A

EARNEST MONEY

From - (… Name of Contractor…)

and should reach **MANAGING DIRECTOR, RAIPUR SMART CITY LIMITED, Raipur,** as per date and time mentioned in the key dates.

3.2 ENVELOPEE – B

i. The Second online Envelopee shall contain terms and conditions and all the technical details and specifications, Scanned copy of terms and conditions, technical specifications and drawings etc. should be submitted online in Envelopee 'B'.

ii. Experience certificate of successful completion of work of same nature in contractor's/firm's/company's own name indicating agreement no., work order no. and date, amount of contract, stipulated period of completion, actual period of completion during last five year i.e. 2012-2013 to 2016-2017. The certificate should be issued by an officer not below the rank of Executive Engineer and shall be countersigned by the officer not below the rank of Executive Engineer or equivalent from STATE GOVT/CENTRAL GOVT/ULB agency.

iii The details of works in hand indicating name of work, Agreement no., work order no., and date, amount of contract, period of completion, value of work and balance work in hand with details of work on the date of submission of Tender.

iv Valid registration certificate in appropriate class.

Financial turn over works during last five financial years i.e. 2012-2013 to 2016-2017. Should be submitted online in Envelopee 'B'.

3.3 ENVELOPEE – C (Online only)

This Envelopee should contain only the Percent Rate Offer. The Tenderer shall fill their Percent Rate in the online form.

Rate (At par SOR or .....percent below/above SOR)

From - (… Name of Contractor…)

3.4.1 EARNEST MONEY IN SEPARATE COVERS: -

The Earnest Money in one of the prescribed forms should be produced/ sent separately and not kept in the covers containing the tender and if the earnest money is not found in accordance with the prescribed mode the tender will be returned unopened to the tenderer.

3.4.2 The amount of Earnest Money should be deposited In shape of BG / FDR/DD if not online from Nationalized bank or scheduled bank drawn in the favour of 'The MANAGING DIRECTOR, RAIPUR SMART CITY LIMITED, Raipur'Payble at Raipur.

3.5 ADJUSTMENT OF EARNEST MONEY:-

Earnest money, which has been deposited for a particular work, will not, ordinarily, be adjusted towards the earnest money for another work.

3.6 SECURITY DEPOSIT :-

(a) The security deposit shall be recovered from the running bills @ 5 percent as per clause-1 of condition of contract. The Security deposit can be submiited in the form of FDR from nationalized/Scheduled Bamk.

(b) The amount of the E.M. D shall not be adjusted when value of work done reaches the limit of the amount of contract or exceeds the probable amount of contract.

(c) One moiety of the security deposit shall be refunded on completion of work as certified by the Engineer in charge.The balance 50% amount shall be refunded on completion of defect liability period or settlement of final bill, whichever is later.

3.7 IMPLICATION OF SUBMISSION OF TENDER:

Tenderers are advised to visit site sufficiently in advance of the date fixed for admission of the tender. A tenderer shall be deemed to have full knowledge of the relevant documents, samples, site etc. whether he inspects them or not.

3.8 The submission of a tender by a contractor implies that he has read the notice, conditions of tender and all other contract documents and made himself aware of the standards and procedure, in this respect, laid down in the National Building Code of India 1970/relevant Indian Standards, CPHEEO Manual, the scope and specification of the work to be done and the conditions and rates at which stores, tools and plants etc., will be issued to him by the Executive Engineer has seen the quarries with their approaches, site of work, etc. and satisfied himself regarding the suitability and availability of site of work etc. and satisfied himself regarding the suitability and availability of the materials at the quarries. The responsibility of opening new quarries and construction and maintenance of approaches there to shall lie wholly with the contractor.

The contractor shall make his own arrangement for supply of water for construction, purposes. No lead and lift for any other material including water will be paid. The tender offer should be inclusive of leads and lifts for the materials. The contractor should himself verify the leads of different materials before submitting his tender.

ESCALATION:-

The scope of work includes all costs, and no escalation will be paid on this account.

3.9 Income Tax clearance certificate - A tenderer purchasing tender documents for works exceeding Rs.2.00 Lacs shall submit either an Income Tax Clearance Certificate in the form printed as annexure D or a certificate from the Income Tax authority that the assessment is under consideration. No tender documents can be issued/sold to him unless such certificate is submitted.

3.10 List of works in progress - Tenders must be accompanied by a list of contracts already held by the tenderer at the time of submitting the tender, in the Department and elsewhere showing therein.

1. The amount of each contract.
2. Balance of work remaining to be done, and
3. The amount of solvency-certificate produced by him at the time of enrollment in the……..

3.11 Relationship - The contractor shall not be permitted to tender for works in the Corporation, (responsible for award and execution of contract) in which his near relative is posted. He shall intimate the names of his near relative working in Chhattisgarh. State and RAIPUR SMART CITY LIMITED, Raipur. He shall also intimate the name of person working with him in any capacity or subsequently employed by him and who are near relatives to any Gazettes Officer in the Chhattisgarh. State. Any breach of this condition by the contractor would render himself liable to be removed from the approved list of contractors of the UADD department. ……

Note - By the terms near relative is meant wife, husband, parents and son, grand son, brothers, sisters, brothers in laws, father in law and mother in law.

3.11 The tender for the works shall be witnessed by a contractor. Failure to observe this condition shall render the tender of the contractor liable to rejection.

4. Opening and Acceptance of tender

4.1 Place and time of opening - The tenders shall be opened at time and place stated in para 1. In the first instances, the Physical Envelopee containing the earnest money shall be opened. If the earnest money is found proper, the online Envelopee -A containing the Earnest Money details, its scanned copy and scan copy of documents required as minimum qualification to bid shall be opened. If the tenderer found qualified as per minimum qualification, the online Envelopee B containing the minutes of prebid meeting (terms and conditions) will be opened in the presence of such contractors, who choose to be present.

After short listing of prequalified contractors, their online financial offers shall be opened. The contractor having quoted percentage offer in prescribed online proforma with minimum cost shall be declared as the lowest bidder.

4.2 Powers of Executive Engineer - The Executive Engineer does not bind himself to accept or recommend for the acceptance to the MANAGING DIRECTOR, RAIPUR SMART CITY LIMITED, Raipur or other higher authority, the lowest or any tender or to give any reasons for his decision.

4.3 Conditional Tender - Conditional tenders are liable to be rejected.

4.4 CANVASSING - Canvassing for support in any form for the acceptance of any tender is strictly prohibited. Any tenderer doing so will render himself liable to penalties which may include removal of his name from the register of approved contractors or penal action under section 8 of the M.P. VinirdishttaBharastaAcharanNivaranVidheyak, 1982.

4.5 **ONLINE SUBMISSION OF TENDER :-**

4.6 AUTHORITY OF EXECUTIVE ENGINEER –

The authority competent to accept a tender, reserve the right of accepting the tender for the whole work or for a distinct part of it, or distributing the work between one or more tenderers.

4.7 VALIDITY OF OFFER –

Tender shall remain open up to 120 days from the date of opening of financial offer and in the event of the tenderer withdrawing the offer before the aforesaid date, for any reason whatsoever, earnest money deposited with the tender shall be forfeited by the MANAGING DIRECTOR, RAIPUR SMART CITY LIMITED, Raipur

4.8 PAYMENTS BY CHEQUES/ ONLINE ACCOUNTING SYSTEM:-

The running payments shall be made in accordance with the Break up schedule of payment as per 'Annexure F' and as per the conditions of the contract and the payments shall be made as per the online accounting system

4.9 TIME OF COMPLETION :-

The time allowed for carrying out the work i.e. 12 months including rainy season shall be strictly observed and shall be reckoned from the date of issue of written order to commence the work. Delay beyond the specified time limit will be subject to liquidated damages according to the conditions of the contract.

5 TIME SCHEDULE:-

The work shall be done by the contractor according to the schedule fixed in consultation with the competent authority. BAR/PERT/CPM chart showing Detailedprogramme shall have to be submitted and adhered to by the contractor.

SPECIFICATIONS:

5.1 BRIEF SPECIFICATION - A brief note on construction and specifications of the work is enclosed in Annexure-E.

5.2 Material of Construction - The materials of construction to be used in the work shall be governed by the provision of part V of the National Building code of India, 1970 and the relevant Indian Standard Specification with amendments & revisions issued up to the date of tender notice.

5.3 WORKMANSHIP - The work shall be carried out according to the specifications referred to hereinafter and according to sound engineering practice. The decision of the Executive Engineer, in respect of workmanship will be final.

5.4 SPECIFICATION FOR BUILDING WORKS - (Including water supply and sanitary fittings)

5.4.1 The contractor shall execute the work in conformity with the standards and procedure laid down in the National Building Code of India, 1970, and as per Chhattisgarh P.W.D. specification, the manual on water supply by CPHEEO or specifications in force or special specification wherever enclose separately, and in accordance with the approved drawings.

5.4.2 CONCRETE - All concrete shall be mixed in concrete mixers and compacted by mechanical Vibrators. Slumps test shall be carried out during concreting and sample test cubes prepared and tested in due course. The testing will be carried out by the Department.

The results of the tests shall confirm with the required standard and if the Engineer-in-charge considers that a structural test is necessary, the same shall be carried out as instructed by the Engineer-in-charge at the contractors expense and should the result of this be unsatisfactory the contractor will be bound to take down and reconstruct the particular portion of work which has given unsatisfactory test results.

5.4.3BRICKS - The contractor should use the bricks manufactured on the metric measures as for as possible.

5.4.4 All timber used in the wood work for all new works must be properly seasoned. In case of important buildings mechanical seasoning should be done in good seasoning plants.

In case the contractor does not procure good seasoned wood, he may be asked to get it seasoned in plant at his own expense but no certificate is required where no additional rate is paid.

5.4.5 MAINTENANCE OF ROOFS - Subject to the provision in the agreement, it will be the responsibility of the contractor to see that the building does not leak, during the period of the first rainy season in respect of tile and sheet roofing and two consecutive rainy seasons in respect of lime concrete and cement concrete terraced roof, after its completion and he will make good and replace all the defective work on this account.

5.5 SPECIFICATION OF ELECTRICAL WORKS -

5.5.1 The work will be carried out as per the approved drawing and as directed by the…… The work will be governed by 'General Specifications' for the Electrical Works in Government buildings in Chhattisgarh state in force from PWD SOR 2009.

5.5.2 All samples of electrical accessories should be got approved from the Engineer-in-charge. Contractor will have to arrange and afford all facilities for their inspection and rectify the defects pointed out by them. A list of accessories is enclosed as Annexure E.

5.5.3 In case of supply of ceiling fan, table fan, exhaust fan, cabin fan, tube light fixtures will be made by …… as mentioned in the C.S.R. As such labour rates only as per C.S.R. will be paid for fitting such items in position as per C.S.R.

5.5.4 The contractor should submit wiring diagram on tracing cloth showing the point position of switch, length of point, position of D.B. and Main switch circuit no. in which points fall at the time of final bill. Otherwise deduction of ½ percent (half percent) will be made from the bill.

5.6SPECIFICATION FOR WORKS-(Excluding bridges and culverts)

The road works and collection of materials for road works shall be carried out according to the Chhattisgarh P.W.D. specifications, as adopted for Building Works or specifications inforce or special specifications, wherever enclose separately, or the relevant norms specified and published by the CPHEEO.

5.7CONTRADICTIONS OR AMENDMENTS - In the event of contradictions between the stipulations of the current schedule of rates (vide part of this N.I.T.) and aforesaid specification (vide para 5.1 to 5.6 above) the stipulation of the current schedule of rates shall gain precedence. In the event of contradictions, if any between different specifications and or codes of practice, refer to above, the decision of the MANAGING DIRECTOR shall be final subjects to appeal in case of dispute before Competent authority within one month of Such Decision.

6. SUPPLY OF MATERIALS : No Material shall be supplied by the RSCL

7. MISCELLANEOUS CONDITIONS :

7.1 **SUBLETTING** - The contractor shall not, without the prior approval of the competent authority in writing, sublet or assign to any other party or parties, the whole or any portion of the work under the contract. Where such approval is granted, the contractor shall not be relieved of any obligation or duty or responsibility which he undertakes under the contract.

7.1 **TAXES** - "The rate quoted by the contractor shall be deemed to be inclusive of all taxes, Royalties and other levies payble under respective statues. The tender cost shall be deemed to be inclusive of all taxes directly related to the contract as prevailing on last date for reciept of tenders. No seperate claim shall be entertained on this account by the department.

7.2 The Engineer-in-charge will grant a certificate for the quantities actually used on the work but will not entertain any claim on this account.

7.2 **M**ineral extracted for works carried out on behalf of the Government of India, from the quarries in possession of controlled by the State Government is subject to payment of Royalty by the contractor to whom it shall not be refundable. The RSCL shall not also issue any certificate in respect of such materials extracted for Government of India work (Applicable to Government of India works only)

7.3 **RULES OF LABOUR CAMPS** - The contractor will be bound to follow the Chhattisgarh Model Rule relating to layout water supply and sanitation on labour camps (vide Annexure-A) and the provision of the National Building Code of India, in regard to constructions and safety.

7.4 **FAIR WAGES** - The contractor shall pay not less than fair wages to labourers engaged by him on the works(rules enclosed vide Annexure-B)

7.5 **WORKS IN THE VICINITY** - The Executive Engineer reserves the right to take up departmental work or to award work on contract in the vicinity without prejudice to the terms of contract.

7.6 **BEST QUALITY OF CONSTRUCTION MATERIALS** - Materials of the best quality will be used as approved by the Executive Engineer.

7.7 **REMOVAL OF UNDESIRED PERSONS** - The contractor shall on receipt of the requisition from the Executive Engineer at once remove any person employed by him on the work who, if in the opinion of the Executive Engineer is unsuitable or undesirable.

7.8 **AMOUNT DUE FROM CONTRACTOR** - Any amount due to RSCL from the contractor on any account concerning works may be recovered from him as arrear of land revenue.

7.9 **TOOLS AND PLANTS** - The contractor shall arrange at his own cost tools and plant required for proper execution of the work. Certain plants may however be issued to the contractor as a special case.

7.10 **RIGHT TO INCREASE OR DECREASE WORK** - The competent authority reserve the right to increase or decrease work.

The competent authority reserves the right to increase or decrease any item of the work during the currency of the contract and the contractor, will be bound to comply with the order of the competent authority without any claim for compensation.

7.11 **TIME SCHEDULE** - The work shall be done by the contractor according to the time schedule fixed by the competent authority.

7.12 **TIME OF CONTRACT** - Time allowed for carrying out the work as entered in the N.I.T. shall be strictly observed by the contractor and shall be reckoned from the date of work order to commence the work.

7.13 **PAYMENT BY CHEQUES**- The payment will be made by cheques. No Bank commission charges on realising such payment will be borned by the department

7.14 **TRANSPORT OF MATERIALS** - The contractor shall make his own arrangement for transport of all materials. The department is not bound to arrange for priority in getting wagon or any other material through all possible assistance by way of recommendation will be given if it is found necessary in the operation by the Engineer-in-charge. If it proves to be in effective, the contractor shall have no claim for any compensation on that account.

8. SPECIAL CONDITIONS :-

8.1 (a) No Reimbursement/refund on variation in prices of D.I. Pipes/materials/POL and Labour wages shall be made in this contract.

(b) In case, the shifting of any existing, water pipe line/sewage line is considered necessary by the Deptt./RAIPUR SMART CITY LIMITED, such service lines will have to be shifted by the contractor for which the payment shall be made for the actual work done as per approved rate of this contract.

(c) Any other specials which do not appear in the schedule of work shall be fabricated with MS pipes for execution of works. As per direction of the engineer-in-charge for which necessary provision has also been made in the schedule of work.

8.2 AGREEMENT

8.2.1 EXECUTION OF AGREEMENT- The tenderer whose tender has been accepted herein after referred to as the contractor, shall produce on appropriate solvency certificate, is so required by the Executive Engineer and will execute the agreement in the prescribed form, within a fortnight of the date of communication of the acceptance of his tender by competent authority. Failure to do so will result in the Earnest Money being forfeited to RSCL and tender being cancelled.

8.2.2 (a) The Contractor shall employ as per norms of PQ Document, Graduate Engineers during the execution of the work :-

(i) One Graduate Engineer when the work to be executed is more than Rs.5 Lakhs

(a) One Diploma Holder, Sub Engineer when the cost of work to be executed is from Rs.2 Lakhs or more but not more than Rs.5 Lakhs.

(b) The technical staff should be available at site whenever required by the Engineer-in-charge to take instructions.

(c) In case the contractor fails to employ the technical staff as aforesaid, the E.E.shall have the right to take suitable remedial measures.

(d) The contractor should give the names and other detail of the Graduate Engineer/Diploma Holder Sub Engineer whom he intends to employ or who is under employment on the work at the time he commences the work.

(e) The contractor should give a certificate to the effect that the Engineer/Diploma Holder Sub Engineer is exclusively in his employment.

Provided that:-

(i) An Engineer or Sub-Engineer may look after more than one work in the same locality but the total value of such work under him should not exceed Rs.25 Lakhs in the case of an Engineer and Rs.5 Lakhs in the case of a Sub Engineer.

(ii) It is not necessary for the contractor's partner in case of firm/company, who is himself an Engineer/Sub-Engineer to employ another Engineer, Sub-Engineer for the Supervision of work.

(iii) The Retired Assistant Engineer who is holding a Diploma may be treated at per with a Graduate for the operation of the above clause.

In case the contractor fails to employ the Technical staff as aforesaid he shall be liable to pay the sum of Rs.20000.00 (Twenty thousand only) for each month of default in the case of every graduate Engineer and Rs.12000.00 (Twelve thousand only) for each month of default in the case of every Diploma holder Sub Engineer.

8.3 CONDITIONS APPLICABLE FOR CONTRACTOR - All the conditions of the tender notice will be binding on the contractors in additions to the condition of the contract in the prescribed form :-

Following documents annexed with this N.I.T. shall form a part of contract.

Special Conditions

(1) The contractor must have experience of executing nature of works.

(2) Joint ventures shall not be allowed in the bidding process.

(3) The experience of last five years shall only be considered for prequalification criteria.

(4) Project Development & Management Consultants (**PDMC**) & IRMA (Independent Review & Monitoring Agency) may be engaged by appropriate authority ofRSCL C.G., will carry out complete supervision, quality control of activities carried out by contractor including checking measurement, designs, drawings, contractorsbill, all deliverables till completion of the contract & rectification of deliverables.

(5) **Approval of Designs & Drawings:**
All design calculations & detailed drawings shall be submitted to RAIPUR SMART CITY LIMITED for approval.

(6) **Third Party Inspection** of all items beyond procurement shall be carried out by **DGSD/SGS/ RITES** based on Datasheets, Quality Assurance Plain & complete specifications as submitted by the Contractor to Engineer –in- charge. Third Party Inspection charges will be borne by the Contractor
Third Party Inspection (TPI) of all pipes, fittings and all kinds of valves, etc shall be carried out based on the Quality Assurance Plan duly prepared and submitted by the contractor. These TPI charges will be borne by the contractor. Further for witnessing the tests at works of the manufacturer by 2 No. officials of the Raipur RAIPUR SMART CITY LIMITED or its representatives, the contractor shall arrange the same and bear the entire cost.

(7) **Performance Security**:The Contractor shall have to submit performance security of amount equal to 5.00 % of the accepted cost at the time of signing of the contract in the form of Bank Guarantee issued by any nationalized/Scheduled banks. The contractor shall have to ensure that such performance security remains valid for the period up to 03 (three) months beyond the completion of defect Liability Period/Extended Defect Liability.

(8) **Receipt for payment by Partners having Power of Attorney**: All correspondence with the Employer and receipts for payments made on account of a work when executed by a firm must be signed in the name of the firm by one of the Partners holding Power of Attorney.

(9) **Mobilisation Advance:** Mobilization advance up to 5% (Five percent) of the contract value may be given if requested by the contractor with in one month of the date of order to commence the work. In such a case the contractor shall furnish Bank Guarantee from schedule bank for the equal amount in favour of the MANAGING DIRECTOR, RSCL before sanction and release of the advance. The advance shall be Interest free. The 5% (Five percent) advance shall be given in two stages

Stage-1: 2% (Two percent) of the contract value payable after signing of the agreement

Stage-2: 3% (Three percent) of the contract value payable on receipt of the certificate from the contractor that he has established complete central and field testing laboratories and has engaged workers/technicians and have brought requisite plants and machineries at work site, and also that the work is physically started and only after construction programme is submitted by the contractor and is duly approved by the Executive Engineer.

(10) **Recovery of Advance:** The recovery of above advances (mobilizations, plants and machineries) shall be recovered in equal monthly installments on pro- rata basis (after 15% (Fifteen percent) of contract work is executed) fromeach of the further running bills. However all these advances shall be fully recovered when 80% (Eighty percent) contract sum is complete or when 75% (Seventy Five percent) of stipulated or validity extended period is over – which ever event is earlier.

(11) **3 %** of bill amount shall be deducted from each bill for hydraulic testing and successful

commissioning of the work. Deducted amount will be refunded in case of successful hydro-testing, to the satisfaction of Engineer-in-charge, for individual structures and also for sectional testing of pipes.

ANNEXURE 'A'	Model Rules relating to labour, water supply and sanitation etc.
ANNEXURE 'B'	Contractor's Labour Regulations
ANNEXURE 'C'	Statement showing the lead of materials
ANNEXURE 'D'	Form of Income Tax clearance certificate
FORM 'A'	Conditions of the Contract
ANNEXURE 'E-'	Specification for Pipe line.
ANNEXURE 'F'	Schedule of Quantities
ANNEXURE 'G-I & G-II'	Proforma of Bank Guarantee
ANNEXURE 'H'	**Special Conditions of NIT**
ANNEXURE 'I'	INFORMATION & INSTRUCTIONS TO THE BIDDERS FOR ONLINE ELECTRONIC GOVERNMENT PROCUREMENT SYSTEM (e-GPS).
ANNEXURE 'J'	Pre-Contract Integrity Pact
Appendix '1'	Qualification Information
Appendix '2'	Experience of similar nature of work
Appendix '3'	List of other construction work
Appendix '4'	Existing Commitments
Appendix '5'	Machinery available with the tenderer
Appendix '6'	Technical Personnel available with the tenderer
Appendix '7'	Financial report
Appendix '8'	Current claims and arbitration
Appendix '9'	List of plants and machinery required
Appendix '10'	List of plants and machinery to be deployed
Appendix '11'	List of personnel to be deployed
Appendix '12'	Contact persons
Appendix '13'	Affidavit

FORM'A'CONDITIONS OF CONTRACT

PERCENTAGE RATE TENDER AND CONTRACT FOR WORKS

(Based on applicable Schedule of Rates)

General Rules and Direction for the Guidance of Contractors

1 Tenders must be invited for all works proposed to be given on contract unless the amount of works proposed to be given on contract is Rs 50,000 or less. The N.I.T. shall be posted in public places signed by the authority inviting the tenders.

N.I.T. will state the work to be carried out as well as the date for submitting and opening tenders and the time allowed for carrying out the work, also the amount of earnest money to be deposited with the tender and the amount of the security deposit to be deposited by the successful tenderer & the percentage, if any to be deducted from bills, it will also state whether a refund of quarry fees, royalties and ground rents will be granted. Copies of the specifications, designs and drawings and a schedule of items quantities and rates of the various description of work and any other documents required in connection with the work signed for the purpose of identification by the authority competent to approve the tender shall also be open for inspection by the contractor at the office of the authority selling the tender forms during office hours.

Further that the schedule of items along with the quantities and rates payable shall be attached to the tender documents and in the event of variation in rates given in such list with the schedule of Rates the rates given in the S.O.R. approved by the competent authority shall prevail.

2 In the event of the tender being submitted by a firm it must be signed separately by each member thereof, in the event of the absence of any partner it must be signed on its behalf by a person holding a power of attorney authorizing him to do so, such power of attorney should be produced with the tender and it must disclose that the firm is duly registered under the Indian partnership Act.

3 Any person who submits a tender shall fill up above or below the S.O.R. specified in rule he is willing to undertake the work. Only one rate of percentage above or below the S.O.R. on all the scheduled terms shall be named. Tenders that propose any alteration in the work specified in the said N.I.T. or in the time allowed for carrying out the work or which contain any other conditions of any sort will be liable to rejection. No single tender shall include more than one work but contractors who wish to tender for two or more works shall submit a separate tender for each Tenders shall have the name and number of the work to which they refer written outside the Envelopee.

4 The authority receiving tenders or his duly authorised assistant will open tenders in the presence of any intending contractors who may be present at the time and will enter the amount of the several tenders in a comparative statement in a suitable form. Receipts for earnest money will be given to all tenderers except those whose tenders are rejected and whose earnest money is refunded on the day the tenders are opened.

5 The Officers competent to dispose of the tenders shall have right of rejecting all or any of the tenders without assigning any reason thereof.

6 The receipt of a clerk for any money paid by the contractor will not be considered as any acknowledgement of payment to the Sub-Divisional/Divisional authority selling the tender form and the contactor shall be responsible for seeing that he procures a receipt signed by that authority or any other person duly authorized by him.

7 The memorandum of work tendered for be filled in and completed before the tender form is issued. If a form is issued to an intending tenderer without having been so filled in and completed he shall request the office to have this done before he completes and delivers his tender.

TENDER FOR WORKS

I/We hereby tender for the execution, for the RAIPUR SMART CITY LIMITEDRaipur, Chhattisgarh of the work specified in underwritten memorandum within time specified in such memorandum at

(In Figures):……

(In Words):……..

Percent below / above/at par with the applicable Schedule of Rates and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in rule 1 thereof and in clause 12 of the annexed conditions and with such materials as are provided for by, and in all other respects in accordance with such conditions as far as applicable.

Memorandum of Work

Name of Work	Reorganizaion of distribution network of Gudhiyari&Khamtarai areas, Raipur. I. Providing, laying and jointing, testing & commissioning of Distribution Network of total length 45.5 Km with DI K-7 Pipe with dia. From 100mm to 400mm Details of pipe line as below- i. 100mm dia.-length 35.23 Km j. 150mm dia.-length 4.465 Km k. 200mm dia-length 1.871Km l. 250mm dia.-length 1.03Km m. 300mm dia.-length 1.86 Km n. 350mm dia.-length 0.82 Km o. 400mm dia.- length 0.23 Km p. MS Pipe for NH/SH-Crossing-casing pipe of 400mm & 300mm Dia. with 10mm thickness along with 100m length. II. Supply, Fixing, Testing & Commissioning of Electromagnetic Flow meter (For Distribution network= 11 nos. with dia. 300 mm and 400 mm) EMF dia. 300 mm -9 nos., dia. 400mm -2 nos. III. Supply, Fixing, Testing & Commissioning of House Service Connection 9,661 nos. (New 8,029 and shifting 1,632=9,619 Connections) (15mm - 9,643 nos., 20mm -13 nos.& 25mm - 5 nos.) without water meter.(Including shifting of Old Connections from Old Pipe line to New Pipe line) . IV. Supply.installation,testing and commissioning of AMR enable waters meters:- 15mm AMR-Multi Jet water meter-11264 nos 20 mm AMR-Multi Jet water meter-21 nos 25mm AMR-Multi Jet water meter-08 nos V. Non SOR Items like MS Specials, Inter connection with existing pipe line, Dismantling of Existing pipes, MS meter box for water meter etc.
Cost of Work put to Tender	**Rs. 1612.87 Lakhs (Rupee Sixteen crore twelve lakhs eighty seven thousand only)**
Earnest Money	Rs. 8.06Lakhs (Rupee Eight Lakhs Six thousand

	only)
Security Deposit (Excluding Earnest Money)	5%
Percentage, if any to deducted from bills	5% amount to be deducted through each RA Bill
Time allowed for the work	12 Months from the reckoned date including rainy season

Should this tender be accepted I/we hereby agree to abide by and fulfill all terms and provisions of the said condition of the contract annexed hereto as far as applicable or in default, thereof to forfeit & pay to the MANAGING DIRECTOR, Raipur Smart City Limited, Raipur or his successors in office the sums of money mentioned in the said conditions.

A separate sealed cover duly super scribed containing the sum of Rs. 8.06Lakhs (Rupee Eight Lakhs Six thousand only)as earnest money the full value of which is to be absolutely forfeited to the said RSCL or his successors in office without prejudice to any other rights or remedies of the said RSCL or his successors in office.

Should I/we fail to commence the work specified in the above memorandum or should I/we not deposit the full amount of security deposit specified in the above memorandum, in accordance with clause 1 of the said conditions of the contract, otherwise the said sum of Rs. 8.06Lakhs (Rupee Eight Lakhs Six thousand only)shall be retained by RSCL on account of such security deposit as aforesaid or the full value of which shall be retained by RSCL on account of the security deposit specified in clause 1 of the said conditions of the contract.

Signature of witness to Contractor's Signature

Dated the day of …… 2018

Signature of the Contractor before submission of tender (with name and seal)

Dated the day of …….. 2018

Name and Address of the witness: ……

Occupation of the witness: ……

The above tender is hereby accepted by me for and on behalf of the RAIPUR SMART CITY LIMITEDRaipur, Chhattisgarh.

Dated the …… day of ……2018

…….

Signature of the Officer by whom accepted

With designation and seal of office

CONDITIONS OF CONTRACT

Definition

A. The contract means the documents, forming the notice inviting tenders and tender documents submitted by the tenderer and the acceptance thereof including the formal agreement executed between the RSCL and the contractor.

B. In the contract the following expressions shall unless otherwise required by the context have the meanings hereby respectively assigned to them:-

(a) The expression 'works' or 'work' shall unless thereby mean something either in the subject or context repugnant to such construction be construed and taken to mean the works or by virtue of the contract contracted to be executed whether temporary or permanent and whether original, altered, substituted or additional.

(b) The 'site' shall mean the land and/or other places on, into or through which work is to be executed under the contract or any adjacent land path or street through which work is to be executed under the contract or any adjacent land, path, or street which may be allotted or used for the purpose of carrying out the contract.

(c) The 'MANAGING DIRECTOR' means MANAGING DIRECTOR of RAIPUR SMART CITY LIMITED

(d) The 'Engineer-in-Charge' means the Executive Engineer or the Assistant Engineer as the case may be who shall supervise and be in charge of the work and who shall sign the contract on behalf of the MANAGING DIRECTOR.

(e) RSCL shall mean 'RAIPUR SMART CITY LIMITED, Raipur'. Competent Authority means MANAGING DIRECTOR of RaipurRAIPUR SMART CITY LIMITED/UADD Chhattisgarh, as the case may be.

(f) The term 'Chief Engineer' means the Competent Authority from UADD.

(g) The term 'Superintending Engineer' means the Superintending Engineer of the concerned UADD as the case may be.

(h) The term 'Executive Engineer'/'Engineer-in-Charge'/'Divisional Officer' means the Executive Engineer of RSCL.

(i) The term 'Assistant Engineer' means the Assistant Engineer RSCL.

(j) The word 'Sub Engineer' shall mean 'Section Officer' of the RSCL.

Note: - 'Words' importing the singular number include plural number and vice-versa,

Clauses	
Clause-1:	The person whose tender may be accepted (hereinafter called the contractor which expression shall unless excluded by or repugnant to the context include his heirs executers, administrators representatives and assigns) shall permit RAIPUR SMART CITY LIMITED, Raipur at the time of making any payments to him for the value of work done under the contract to deduct the security deposit as under. The Security Deposit to be taken for the due performance of the contract under the terms & conditions printed on the tender form will be the earnest money plus a deduction of 5 (Five) percent from the payment made in the running bills, till the two together amount to 5 (Five) percent of the cost of work put to tender or 5 (Five)

	percent of the cost of the works executed when the same exceeds the cost of work put to tender.
Clause-2: Compensation for delay	**<u>For Works, for Which the Completion Period is Six (6) months or less.</u>** The time allowed for carrying out the work, as entered in the tender form, shall be strictly observed by the contractor and shall be deemed to be the essence of the contract and shall be reckoned from the fifteenth day after the date on which the order to commence the work is issued to the contractor, for a work where completion is up to 6 months.
	<u>For Works, for Which the Completion Period is beyond Six (6) months</u> The period will be reckoned from the thirtieth day after the date on which the order to commence the work is issued to contractor. The work shall throughout the stipulated period of contract be proceeded with all due diligence, keeping in view that time is the essence of the contract. The contractor shall be bound in all cases, in which the time allowed for any work exceeds one month, to complete 1/8th of the whole work before 1/4th of the whole time allowed under the contract has elapsed, 3/8 th of the work before 1/2 of such time has elapsed and 3/4th of the work before 3/4th of such time has elapsed. In the event of the contractor failing to comply with the above conditions, the Executive Engineer shall levy on the contractor, as compensation an amount equal to: 0.5% (zero point five percent) of the value of work (contract sum) for each week of delay, provided that the total amount of compensation under provision of this clause shall be limited to 6% (six percent) of value of work. (Contract sum) Provided further that if the contractor fails to achieve 30% (thirty percent) progress in 1/2 (half) of original or validly extended period of time (reference clause 5 below) the contract shall stand terminated after due notice to the contractor and his contract finallised, with earnest money and or security deposit forfeited and levy of further compensation at the rate of 10% of the balance amount of contract left incomplete, either from the bill, and or from available security/performance guarantee or shall be recovered as 'Arrears of land revenue'.
Clause-2.2	The decision of the MANAGING DIRECTOR RSCL in the matter of grant of extension of time only (reference clause 5 below) shall be final, binding and conclusive. But he has no right to change either the rate of compensation or reduce and or condone the period of delay, once such an order is passed by him (on each extension application of the contractor) it shall not be open for a revision. Where the MANAGING DIRECTOR, RSCL decides that the contractor is liable to pay compensation for not giving proportionate progress under this clause and the compensation is recommended during the intermediate period, such compensation shall be kept in deposit and shall be refunded if the contractor subsequently makes up the Progress for the lost time, within the period of contract including extension granted, if any failing which the compensation amount shall be forfeited in favour of the RSCL.
Clause-3: Action when the work is left	The MANAGING DIRECTOR may terminate the contract if the contractor causes a

incomplete abandoned or delayed beyond the time limit permitted by the MANAGING DIRECTOR	fundamental breach of the contract. Fundamental breach of contract shall include, but not be limited to, the following: - (a) The contractor stops work for four weeks, when no stoppage of work is shown on the current programme or the stoppage has not been authorised by the MANAGING DIRECTOR. *(b)* The MANAGING DIRECTOR gives notice that failure to correct a particular defect is a fundamental breach of contract and the contractor fails to correct it within reasonable period of time determined by the MANAGING DIRECTOR in the said notice. (c) The contractor has delayed the completion of work by the number of weeks [12 (Twelve) weeks] for which the maximum amount of compensation of 6% of contract sum is exhausted. (d) If the contractor has not completed at least thirty percent of the value of construction work required to be completed in half of the completion period (Including validly extended period if any). (e) If the contractor fails to appoint the technical staff and if appointed do not function properly for 4 weeks even after due written notice by the MANAGING DIRECTOR. (f) If he violates labour laws and or State/ Central Government statutory regulations and laws, the reason for action can be taken by the MANAGING DIRECTOR. (g) If the Contractor fails to set up field laboratory with appropriate equipments, within 30 day from the reckoned date. (* for each contract valued more than Rupees 3 crores). (h) Any other deficiency which goes to the root of the contract Performance If the contract is terminated, the contractor shall stop work immediately, make the site safe and secure and leave the site as soon as reasonably possible. The Executive Engineer shall cause recording and checking of measurements of all items of work done (taking in to account quality and quantity of items actually executed) and prepare the final bill after adjusting all pervious outstanding dues. Such recording of measurements shall be done after due notice regarding time and date of recording measurement and directing the contractor to either remain present himself or his authorized representative so as to satisfy himself that the recording of measurement is just and proper. Failure on his parts either to attend and or refusing to acknowledge the measurement so recorded in the department measurement book, shall be at his sole risk and responsibility. In addition to the provision contained in clause 2 above the MANAGING DIRECTOR shall forfeit the earnest money and or security deposit and further recover/deduct/adjust a compensation equal to difference of amount the balance value of work left incomplete which is required to be completed from another contractor at the risk and cost of the original contractor either from the bill, and or from available security/performance guarantee or by any other means and shall be recovered as 'Arrears of land revenue'
Clause-4:Power to take possession of or require removal of	In any case in which any of the powers, conferred upon the MANAGING DIRECTOR by clause - 3 hereof shall have become exercisable and the same shall not be exercised, the non-exercise thereof shall not constitute a waiver of any of

Materials Tools and Plants or sale of Contractor's Plants etc	the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor for which by any clause or clauses hereof he is declared liable to pay compensation shall remain unaffected. In the event of the MANAGING DIRECTOR putting in force either of the power clause 3 vested in him under the preceding clause he may, if he so desires, take possession of all or any tools, plant materials, and stores in or upon the works, or the site thereof or belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof paying or allowing for the same in account at the contract rates, or in case of these not being applicable, at current market rates to be certified by MANAGING DIRECTOR, whose certificate thereof shall be final; otherwise the MANAGING DIRECTOR may by notice in writing to the contractor or his clerk of the works foreman or authorised agent require him to remove such tools plant, materials or stores from the premises (within a time to be specified in such notice) and in the event of the contractor failing to comply with any such requisition, the MANAGING DIRECTOR may remove them at the contractors expense sell them by auction or private sale on account of the contractor & at his risk in all respects and the certificate of the MANAGING DIRECTOR as to the expense of any such removal and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.
Clause-5	Extension of Time
Clause-5.1: Extension due to unavoidable hindrances	If the Contractor shall desire an extension of time for completion of work on ground of his having been '**UNAVOIDABLY**' hindered in its execution or on any other ground, he must apply giving all and complete details of each of such hindrances or other causes in writing, to the MANAGING DIRECTOR positively within 15 days of occurrence of such hindrance(s) and seek specific extension of time (period from ..... to .....) In case the grounds shown by the contactor are reasonable, the MANAGING DIRECTOR shall be competent to grant the extension himself as under : 1 If the extension of time sought is more than above period mentioned, then the Executive Engineer shall refer the case to the MANAGING DIRECTOR with his recommendation and only after his decision in this regard, the Executive Engineer shall sanction extension of such time as decided by the MANAGING DIRECTOR. 2 Once the MANAGING DIRECTOR/ Competent Authority has decided the case of extension of time with reference to the particular application of the contractor, it will not be competent for them to review/change such a decision later on. However, the MANAGING DIRECTOR and the Executive Engineer shall give the contractor an opportunity to be heard (orally and or in writing), before taking any final decision either of granting extension of time or permitting the contractor to complete the work by the delayed date (under clause 2 of the contact) or before refusing both. 3 Provided further where the MANAGING DIRECTOR has recommended grant of extension of particular time under clause 5.1 of the contract or has refused to recommend extension of time but has recommended permitting the contractor for delayed completion, (clause 2) the contractor shall continue with the work till the final decision by competent authority/ MANAGING DIRECTOR.

	4 Failure on the part of the contractor for not applying extension of time even within 30 days of the cause of such an hindrance, it shall be deemed that the contractor does not desire extension of time and that he has 'Waived' his right if any, to claim extension of time for such cause of hindrance. 5 Once the Competent Authority / MANAGING DIRECTOR has heard (oral and or in writing) the contractor on this subject matter of extension of time and if Executive Engineer/ MANAGING DIRECTOR fails to communicate his decision within a period of 30 days of such hearing, it shall be deemed that the contractor has been granted extension of time for the period as applied by him.
Clause-5.2: Compensation Events for consideration of extension of time without penalty	Not Applicable The following mutually agreed Compensation Events unless they are caused by the contractor would be applicable; (a) The Executive Engineer does not give access to a part of the site. (b) The Executive Engineer modifies the schedule of other contractor in a way, which affects the work of the contractor under the contract. (c) The Executive Engineer orders a delay or does not issue drawings, specification or instructions /decisions/approval required for execution of works on time. (d) The Executive Engineer instructs the contractor to uncover or to carry out additional tests upon work, which is then found to have no defects. (e) The Executive Engineer gives an instruction for additional work required for safety or other reasons.1 (f) The advance payment and or payment of running bills (complete in all respect) are delayed. (g) The Executive Engineer unreasonably delays issuing a Certificate of Completion (h) Other compensation events mentioned in contract if any
Clause-5.3: Incentive Bonus	Not Applicable
Clause-6: Final Certificate	On completion of the work the contractor shall be furnished with a certificate by the MANAGING DIRECTOR / Executive Engineer (hereinafter called the MANAGING DIRECTOR) of such completion in the form appended at the end, but no such certificate shall be given, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the works shall be executed, all scaffolding surplus materials and rubbish, and cleaned off the dirt from all wood-work, doors windows walls, floors or other parts of any building in upon or about which the work is to be executed or of which he may have had possession for the purpose of the execution there of nor until the work; shall have been measured by the Engineer-in-charge whose measurements shall be binding and conclusive against the contractor. If the contractor shall fail to comply with the requirements of this clause as to removal of scaffolding surplus materials and rubbish and cleaning of dirt on or before the date fixed for the completion of the work, the Engineer-in-charge may, at the expense of the contractor remove such scaffolding, surplus materials and rubbish and dispose of the same as he thinks fit and clean off such dirt as aforesaid and the contractor shall forthwith pay the amount of all expenses so incurred, and shall have no claim in respect of any such

	scaffolding or surplus materials as aforesaid, except for any sum actually realized by the sale thereof.
Clause-7: Payment on Intermediate certificate to be regarded as advances	No payments shall ordinarily be made for work estimated to cost less than Rs. 1,000/- (Rs. One Thousand) till after the whole of the works shall have been completed and certificate of completion given but if intermediate payment during the course of execution of works is considered desirable in the interest of works, the contractor may be paid at the discretion of the MANAGING DIRECTOR But in the case of works estimated to cost more than rupees one thousand, the contractor shall on submitting the bill therefore be entitled to receive a monthly payment proportionate to the part thereof then approved and passed by the MANAGING DIRECTOR whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor. But all such intermediate payments shall be regarded as payments by way of advance against the final payment for works actually done and completed and shall not preclude the requiring of bad unsound and imperfect or unskillful work to be removed and taken away and reconstructed or erected or be considered as an admission of the due performance of the contract or any such part thereof, in any respect, or the accruing of any claim, nor shall it conclude determine, or affect in any way the powers of the MANAGING DIRECTOR under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be submitted by the contractor within one month of the date fixed for completion of the work, otherwise the Engineer -in-charge's certificate of the measurement and of the total amount payable for work accordingly shall be final and binding on all parties.
Clause-8: Bills to be submitted monthly	'A bill shall be submitted by the contractor by 15th day of each month for all works executed by him till the end of previous month less the gross amount received by him till the last previous month. This bill must be supported by records of detail measurement of quantities of all executed items of work along with true copies of record and result of all tests conducted in the previous month (date wise). The Executive Engineer shall take or cause to be taken the requisite measurement for purpose of having the same verified/checked by the sub Engineer and Assistant Engineer concern for quantity, quality and specification and examining all the 'test results' and record the same in the Departmental measurement, book. Based on above record measurement bill shall be corrected /prepared afresh. The contractor shall sign the measurement and the bill. The MANAGING DIRECTOR shall pay running bills by 25th day of the month subject to availability of the funds If the contractor fails to submit, the bill on or before the day prescribed, the Executive Engineer after waiting for another 15 days shall depute a subordinate to measure the said work in the presence of contractor and or his authorized Engineer/Representative, whose counter signature to the measurement recorded with quantity and quality remark will be sufficient proof for acceptance of the same and shall be binding on the contractor All such running bill payments are by way of 'Advances' and shall be subject to final adjustment.
Clause-9: Bills to be on Printed forms	The contractor shall submit all bills on printed forms to be had on application at the office of the Engineer– in– charge, and the charges in the bills shall always be entered at the rates specified in the tender or in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender

	at the rates hereinafter provided for such work. The deduction or addition as the case may be of the percentage will be calculated on the amount of the bill for the work done, after deducting the cost of materials supplied departmentally at rates specified in the agreement.
Clause-10: Receipts to be signed by Partners having Authority to do so.	Receipts for payments made on account of a work when executed by a firm must also be signed by the several partners, except where the contractors are described in their tender as a firm in which case the receipt must be signed in the name of-the firm by one of the partners, or by some other person having authority to give effectual receipt for the firm.
Clause-11A: Advance to Contractors	The provision for advances in clause 11 A (i) and (iii) will apply to contract above Rs. One crore only.
Clause-11A(i): Mobilization Advance	Mobilization advance up to 5 % (Five percent) of the contract value shall be given if requested by the contractor with in one month of the date of order to commence the work. In such a case the contractor shall furnish Bank Guarantee from schedule bank for the equal amount in favour of the MANAGING DIRECTOR before sanction and release of the advance. This advance shall be Interest free. This 5% (Five percent) advance shall be given in the two stages **Stage-1:** 2% (Two percent) of the contract value payable after signing of the agreement. **Stage-2:** 3% (Three percent) of the contract value payable on receipt of the certificate from the contractor that he has established complete central and field testing laboratories and has engaged workers/technicians and have brought requisite plants and machineries at work site, and also that the work is physically started and only after construction programme is submitted by the contractor and is duly approved by the Executive Engineer. MANAGING DIRECTOR shall sanction the mobilization advance
Clause-11A(ii): Advance on Plant and Machinery	Not applicable
Clause-11A(iii): Recovery of advance	The Recovery of above advances (mobilization, plants and machineries) shall be recovered in equal monthly installments on pro-rata basis (after 15% (fifteen percent) of contract work is executed) from each of the further running bills. However, all these advances shall be fully recovered when 80% (Eighty percent) contract sum is complete or when 75% (Seventy Five percent) of stipulated or validly extended period is over - which ever event is earlier.'
Clause-11B: Secured Advance	Advance payments to contractor are as a rule prohibited, and every endeavor should be made to maintain a system, under which no payments are made for unmeasured work except for work actually done. Exceptions are, however permitted in the following cases. Cases in which a contractor whose contract is for finished work, requires an advance on the security of materials brought to site, MANAGING DIRECTOR may in such cases sanction advances up to an amount not **exceeding 75%** of the value of material and **90%** in the case of steel (as assessed by the Executive Engineer) provided that the rate(s) of allowed in no case is/are more than the rate payable for the finished item as stipulated in the contract

	of such materials, provided that they are of imperishable nature and that a formal agreement is drawn up with the contractor under which RAIPUR SMART CITY LIMITED, Raipur secures a lien on the materials and is safeguarded against losses due to the contractor postponing the execution of the work or to the shortage or misuse of the materials, and against the expense entitled for their proper watch and safe custody. Payment of such advances should be made only on the certificate of an officer not below the rank of Executive Engineer, that the quantities of materials upon which the advances are made have actually been brought to site, that the contractor has not previously received any advance on that security and that all the materials are required by the contractor for use on items of work for which rates for finished work have been agreed upon. Recoveries of advances so made should not be postponed until the whole of the work entrusted to the contractor is completed. They should be made from his bills for work done as the materials are used the necessary deductions being made whenever the item of work in which they are used; are billed for. Before granting the above-secured advance the contractor shall sign the prescribed Indenture Bond in the prescribed form.
Clause-11C: Escalation	Not Applicable
Clause-12: Work to be executed in Accordance with Specification, Drawing, Order, etc	The contractor shall execute the whole and every part of work in the most substantial and workman like manner, and both as regards materials and otherwise in every respect in strict accordance with the specifications as provided in Annexure E. The contractor shall also conform exactly fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the Engineer – in – charge and lodged in his office and to which the contractor shall be entitled to have access at such office or on the site of the work for the purpose of inspection during office hours and the contractor shall, if he so requires, be entitled at his own expense to take or cause to be made copies of the specifications, and of all such designs, drawings and instructions as aforesaid. The B.I.S. codes for various components of scheme or special specifications whenever enclosed separately shall apply in the case of any variance the following. 1 Specification as per NIT 2 Annexure-F, Schedule of Quantity / Price Schedule 3 Annexure-E, Specifications 4 Relevant IS Codes Mode of measurements shall be as provided in the Specifications (Annexure-E) and or SoR, applicable to the relevant item in the contract. Where such mode of measurement is not specified in the Specifications / SoR, it shall be done as per the instructions of the MANAGING DIRECTOR, RSCL on the basis of prevailing market rates. However if any mode of measurement is specifically mentioned in the N.I.T. the same will get precedence over all the above.
Clause-13: Variations: **Additions, alterations in**	The MANAGING DIRECTOR, RSCL shall have power to make any alterations in, omissions from, additions to, or substitutions for, the original specifications, drawings, designs and instruction, that may appear to him to be necessary or advisable during the progress of the work, and the contractor shall be bound to carry out the work in accordance with any instruction which may be given to him in

Specifications and Designs	writing, signed by the MANAGING DIRECTOR and such alterations, omissions, additions or substitution shall not invalidate the contract and any altered, additional works, or substituted work, which the contractor may be directed to do in the manner above specified as part of the work; shall be carried out by the contractor on the same conditions in all respects on which be agreed to do the main work and at the same rates as are specified in the tender for the main work, provided the total value of all such increased or altered or substituted work **does not exceeds 25% (Twenty five percent)** of the amount of administrative approval. If such total value **exceeds 25% (Twenty five percent)** it shall be open to the contractor either to determine the contract or apply for extension. But in no case the contractor shall be entitled to any rate other than the accepted rate. **Note**: - Such additions, alterations, substitution, shall have to be within the Scope of work tendered
Clause-13.1: Rates for works not in schedule of rates	For rate of any extra item, MANAGING DIRECTOR shall pay 75% of the provisional rate till such time as the rates are finally determined by the Executive Engineer. If during the course of execution, where it is found necessary that certain item/items of work not provided for in the S.O.R. required to be carried out then the Engineer in Charge shall identify such item / items including approximate quantity of the contract and ask the contractor to submit his rates in writing supported by the requisite data within **a period of 7 days**. The **Engineer – in – charge** shall obtain approval / modification of the proposed rate from the MANAGING DIRECTOR/ Competent Authority and communicate the same within a period of 4 weeks to the contractor, in case the contractor agrees to the above rates as fixed by the MANAGING DIRECTOR / Competent Authority then they shall form a part of supplementary schedule of the contract agreement .If the contractor does not agree to the rate of the MANAGING DIRECTOR.Then it shall be open for the MANAGING DIRECTOR to get the work executed through any other agency. The contractor will not however be entitled to any compensation due to delay or hindrance or loss of profit accruing on account of this extra work executed by alternative agency. If the contractor commences non-schedule work or incur expenditure in regard thereto before the rates shall have been determined by the MANAGING DIRECTOR, then he shall be entitled for payment for the work done as may be finally decided by the MANAGING DIRECTOR. In the event of dispute, the decision of the Competent Authority shall be final. Such a decision shall be given by the C.E. within a period of 30 (Thirty) days and it shall be open to the contractor not to continue that item further. In such an event that item shall be got executed by other agency at such an approved rate by MANAGING DIRECTOR. Contractor may either determine his contract if variations exceeds 25 (Twenty five) % of the Administrative approval, or may apply for extension. **Extension of time in consequence of variations** The time for the completion of work shall be extended in proportion of the variation of the work bear to the original contract work and certificate of MANAGING DIRECTORshall be conclusive as to such proportion. **NO CLAIM TO ANY PAYMENT OR COMPENSATION FOR ALTERATION IN OR**

	RESTRICTION OF WORKS
Clause-14: Suspension of Works	If at any time after the execution of the works, theMANAGING DIRECTOR shall for any reason whatsoever require the whole or any part of the work as specified in the tender to be stopped for any period or shall not require the whole or part of the work to be carried out at all or to be carried out by the contractor he shall give notice in writing of the fact to the contractor who shall there upon suspend or stop the work totally or partially, as the case may be. If any such case, except as provided hereunder, the contractor shall have no claim to any payment or compensation what so ever on account of any profit or advantage which he might have derived from the execution of the work in full, but which he did not so derive in consequence of the full amount of the work not having been carried out, or on account of any loss that he may be put to on account of materials purchased or for unemployment of labour recruited by him. He shall not also have any claim for compensation by reason of any alteration having been made in the original specifications, drawing, designs and instructions, which may involve any curtailment of the work as originally contemplated. Where, however, materials have already been purchased or agreed to be purchased by the contractor shall be paid for such materials at the rates determined by the MANAGING DIRECTOR, provided they are not in excess of requirement and of approved quality and / or shall be compensated for the loss, if any that he may be put to, in respect of materials agreed to be purchased by him, the amount of such compensation to be determined by the MANAGING DIRECTOR whose decision shall be final. If the contractor suffers any loss on account of his having to pay labour charges during the period during which the stoppage of work has been ordered under this clause, the contractor shall, on application be entitled to such compensation on account of labour charges as the MANAGING DIRECTOR, whose decision shall be final, may consider reasonable provided that the contractor shall not be entitled to any compensation on account of labour charges, if in the opinion of the MANAGING DIRECTOR, the labour could have been employed by the contractor else where for the whole or part of the period during which the stoppage of the work has been ordered as aforesaid. If the total duration of suspension of the work is more than the six months, then this suspension of the work will be considered as permanent stoppage of the work, and the contractor can determine the contract, if he so desires.
Clause-15: Action and Compensation payable in case of Bad works	If at any time before the security deposit is refunded to the contractor, it shall appear to the MANAGING DIRECTOR or his subordinate in charge of the work, that any work has been executed with unsound, imperfect or unskillful workmanship or with material of inferior quality or that any materials or articles provided by him for the execution of the work are unsound, or of a quality inferior to that contracted for, or are otherwise not in accordance with the contract, it shall be lawful for the MANAGING DIRECTOR to intimate this fact in writing to the contractor and then notwithstanding the fact that the work, materials or articles complained of may have been Inadvertently passed, certified and paid for contractor shall be bound forthwith to rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require, or if so required, shall remove the materials or articles so specified and provide other proper and suitable materials or articles at his own proper charge and cost, and in the event of his failing to do so within a period to be specified by the MANAGING DIRECTOR in the written intimation aforesaid, the contractor shall be liable to pay compensation at the rate of one percent on the amount of contract put to tender every day not exceeding ten days, during which the failure so, continues and in the case of any such failure the MANAGING DIRECTOR may rectify or remove and, re-execute the work or remove and replace

	the materials or articles complained of as the case may be at the risk and expense in all respects of the contractor. Should the MANAGING DIRECTOR consider that any such inferior work or materials as described above may be accepted or made use of it shall be within his discretion to accept to the same at such reduced rates as he may fix therefore
Clause-16: Works to be open for inspection- Contractor or responsible agent to be present	All work under or in course of execution or executed in pursuance of the contract shall at all time be open to the inspection and supervision of the MANAGING DIRECTOR and his subordinates and the contractor shall at all time during the usual working hours, and at all other times at which reasonable notice of the intention of the MANAGING DIRECTOR or his subordinate to visit the work shall have been given to the contractor, either himself be present to receive orders and instruction or have a responsible agent duly accredited in writing present for that purpose. Orders given to the contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.
Clause-17: Notice to be given before work is covered up	The contractor shall give not less than five days notice in writing to the MANAGING DIRECTOR or his subordinate in charge of the work before covering tip or otherwise placing beyond the reach of measurement any work in order that the same may be measured, and correct dimensions thereof be taken before the same is so covered up or placed beyond the reach of measurement, any work without the consent in writing of the MANAGING DIRECTOR or his subordinate in charge of the work and if any work shall be covered up or placed beyond the reach of measurement with out such notice having been given or consent obtained, the same shall be uncovered at the contractors expenses, or in default thereof, no payment or allowance shall be made for such work or the materials with which the same was executed.
Clause-18: Contractor liable for damage done and for imperfections after certificate of completion	If the contractor or his work people or servants shall break, deface injure or destroy any part of building in which they may be working or any building, road, road curbs, fences, enclosures, water pipes, cables drains, electric or telephone posts or Wires trees grass or grassland or cultivated ground continuous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work while in progress, from any cause whatever, or any imperfections become apparent ,the contractor shall make good the same at his own expense or in default, the MANAGING DIRECTOR may cause the same to be made good by other workmen and deduct the expense of which certificate of the MANAGING DIRECTOR shall be final) from any sums that may be then or at any time thereafter, may become due to the contractor or from his security deposits, or the proceeds of sale thereof or of a sufficient portion thereof. **The security deposit** of the contractor to **the extent of 50%** shall be refunded on his getting the completion certificate, provided that all the recoveries outstanding against him are realized. **Balance 50% of the amount** shall be refunded after four months of completion of work or final bill paid whichever is earlier

Clause-19: Contractor to Supply plant, ladders, scaffolding, etc	The contractor shall supply at his own cost materials (except such special materials if any, as may in accordance with the contractor be supplied from the Engineer – in – charge's Stores) plants, tool, appliances, implements, ladders, cordage, tackle, Scaffolding and temporary work requisite for the proper execution the work whether original, or altered or substituted, and whether included in the specification or other documents forming part of the contractor referred to in these condition or not or which may be necessary for the purpose of satisfying or complying with the requirement of the MANAGING DIRECTOR as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage there for to and from the work . The contractor shall also supply without charge requisite number of persons with the means and materials necessary for the purpose of setting out works, and counting, weighing& assisting in the measurement or examination at any time and from time to time of the work, or materials. Failing his so doing the same may be provided by the MANAGING DIRECTOR at the expenses of the contractor and the expenses may be deducted from any money due to the contractor under the contract, or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof. Contractor is liable for damages arising from non-provision of lights fencing etc. The contractor shall also provide at his own cost except when the contract specifically provides otherwise and except for payments due under clause all necessary fencing and lights required to protect the public from accident and shall be bound to bear the expenses of defence of every suit, action or proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions & to pay any damage and costs which may be awarded in any such suit, action or proceedings to any such person or which may with the consent of the contractor be paid to compromise any claim by any such person.
Clause-20: Compensation under section 12 sub-section (1) of the workman's compensation act 1923	In every case in which by virtue of the provisions of section 12 sub-section (1) of the workman's compensation Act 1923 RSCL is obliged to pay compensation to a workman employed by the contractor in execution of the works, MANAGING DIRECTOR will recover from the contractor the amount of compensation so paid and without prejudice to the rights of RSCL under section (1) sub-section (2) of the said Act. MANAGING DIRECTOR shall be at liberty to recover the amount or any part there of by deducting it from the security deposit or from any sum due by RSCL to the contractor whether under this contract or otherwise. RSCL may not be bound to contest any claim made against them under section-12 sub-section (1) of the said Act except on the written request of the contractor and upon his giving to RSCL full security for all cases for which RSCL might become liable in consequence contesting such claim.
Clause-21: Labour	The contractor should get himself registered under contract - labour regulations and abolition Act 1970 including its amendments after getting a certificate from the principal employer, who will be the MANAGING DIRECTOR, RSCL
Clause-22:Labour below the age of 14 years	No labour below the age of 14 years shall be employed on the work
Clause-23: Fair Wage	The contractor shall pay not less than fair wage to labour engaged by him on the work. **Explanation:** **(a)** Fair wage' means wage(s) whether for time or piece work notified

	during the period of execution of contract for the work and where such wages have not been so notified, the wages prescribed by the Works Department SOR for that period **(b)** The contractor shall, notwithstanding the provisions of any contract to the contrary cause to be paid a fair wage to labourers indirectly engaged on the work including any labour engaged by his sub-contractors in connection with the said work, as if the labourers had been immediately employed by him. **(c)** In respect of labour directly or indirectly employed on the work for the performance of the contractors part of this agreement the contractor shall comply with or cause to be complied with the Labour Act in force. **(d)** The MANAGING DIRECTOR/ Executive Engineer shall have the right to deduct, from the moneys due to the contractor, any sum required or estimated to be required for making good the loss suffered by a worker or workers by reasons of non-fulfillment to the conditions of the contract for the benefit of the workers nonpayment of wages or deductions made from his or their wages, which are not justified by the terms of the contract or non observance of the regulations. **(e)** The contractor shall be primarily liable for all payments to be made under and for observance of the regulations afore said with out prejudice to his right to claim indemnity from his sub-contractors. **(f)** The regulations aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.
Clause-24: Sub-letting of Works	The contract may be rescinded and security deposit forfeited, for subletting the work beyond permissible limits as per clause 7.1 of appendix 2.10 or if contractor becomes insolvent. Note: Such subletting/assignment shall not be made to any other Contractor registered in Class A to D (unified registration Category) in the Public Works Department of Chhattisgarh or in similar Category in other Department of the State or in other organization or Agency (Class with about similar financial capacity) by whatever name these are called.'
Clause-24.1	The contract shall not be assigned or sublet without prior sanction of the authority who has recommended the tender in writing. And if the contractor assign or sublet his contract, for more than permissible limits as per clause 7.1 of appendix 2.10 or attempt to do so, or becomes insolvent commence any insolvency proceedings or make any composition with his creditors, or attempt to do so or if any gratuity, gift, loan, perquisite, reward of and advantage pecuniary or otherwise, shall either directly or indirectly be given, promised or offered by the contractor, or any of his servants or agents or to any public officer or person in the employ of Government in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the MANAGING DIRECTOR may there upon by notice in writing rescind the contract, and the S.D. of the contractor shall there upon stand forfeited and be absolutely at the disposal of RSCL and the same consequences shall ensure as if the contract had been rescinded under clause 3 thereof, and in addition the contractor shall not be entitled to recover or be paid for an ugly work thereto for actually performed under the contract.

	Any such assignment/subletting within the limit of 50% by the authority who has accepted the tenders OR 75 % by the next higher authority accepting the tender or Competent Authority as the case may be ,shall not diminish or dilute the liability/ responsibility of the contractor. If the contractor gets item / items of work executed on a task rate basis **without** materials, this shall not amount to subletting of the contract. **Any subcontracted work, done in Chhattisgarh state with prior approval of competent authority, such subcontractor will also get the credit for work towards his experience**
Clause-24.2	The department shall be empowered to terminate any contract if the contractor sublets the works to some other person on the basis of power of attorney.
Clause-24.3	Subletting of work shall result in reduction in experience of the main contractor to the extent of the sublet.
Clause-25: Sum payable by way of Compensation to be considered as reasonable compensation without reference to actual loss	All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of RSCL without reference to the actual loss or damage sustained, and whether or not any damage shall have been sustained.
Clause-26: Change in the Constitution of Firm	In the case of tender by partners any change in the constitution of the firm shall be forthwith notified by the contractor to the MANAGING DIRECTOR for his information, and contractor shall initiate steps for fresh & new registration which shall be assessed & decided by the competent authority for fresh registration
Clause-27: Work to be under Direction of MANAGING DIRECTOR	All works to be executed under the contract shall be executed under the direction and subject to the approval in all respect of the MANAGING DIRECTOR for the time being who shall be entitled to direct at what point or points and in what manner they are to commenced and from time to time carried on.
Clause-28: Arbitration Clause	Where otherwise provided in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions here in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim right, matter or any other thing what so ever, in any way arising out of or relating to the contract, design, drawings, specifications, estimates, instructions, order or to the condition or otherwise concerning the work or regarding the execution or failure to execute the same whether arising during the progress of work or after the completion thereof as described here in after shall be referred to the Chairman for sole arbitration by himself or by any Office appointed by him. It is a term of the contract that only such question and disputes as were raised during progress of work till its completion and not thereafter shall be referred to arbitration. However, this would not apply to the questions and disputes relating to liabilities of parties during the guarantee period after completion of the work. It is a term of the contract that the party invoking arbitration shall give a list of

	disputes with amounts of claim with supporting documents thereof in respect of each said disputes along with the notice seeking appointment of arbitrator. It is also a term of the contract that if the contractor does not make any demand for appointment of arbitrator in respect of any claims/disputes in writing, as aforesaid, within 120 days of receiving the intimation from the Managing Director or his nominee that the final bill is ready for payment, the claim of the contractor shall be deemed to have been waived and absolutely barred and the RSCL shall be discharged and released of all liabilities under the contract in respect of these claims. It is also a term of the contract that the arbitrator shall adjudicate only such disputes/claims as referred to him by the appointing authority and give separate award against each dispute/claim referred to him. The arbitrator will be bound to give claim wise detail and speaking award and it should be supported by reasoning. The award of the arbitrator shall be final, conclusive and binding on all the parties to the contract. The arbitrator from time to time, with the consent of both the parties, enlarges the time for making and publishing the award. Arbitration shall be conducted in accordance with the provision of Indian Arbitration Act, 1996 or any statutory modifications or re-enactment thereof and rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. It is also a term of the contract that if any fees are payable to the arbitrator, this shall be paid equally by both the parties. It is also a term of the contract that the arbitration shall be deemed to have been entered on the reference on the date he issued the first notice to both the parties calling them to submit their statement of claims and counter statement of claims. Venue of the arbitration shall be such place as may be fixed by the arbitrator at his sole discretion".
Clause-29: Lump sum in Estimate	When the estimate on which a tender is made includes lump sums in respect of part of the works, the contractor shall be entitled to payment in respect of the items of work involved or the part of the work in the question at the same rates as are payable under this contract for such items, or if the part of the work in question is not, in the opinion of the MANAGING DIRECTOR, capable of measurement, the MANAGING DIRECTOR may at the his discretion pay the lump sum amount entered in the estimates , and the certificate in writing of the MANAGING DIRECTOR shall be final and conclusive against the contractor with regard to any sum or sums payable to him under the provisions of this clause.
Clause-30: Action where no specifications is stated	In the case of any class of work for which there is no specification as is mentioned in Rule such work shall be carried out in accordance with the specification approved by MANAGING DIRECTOR / Competent Authority for application to works

Clause-31: Contractor's Percentage whether Applied to Net or Gross Amounts of Bills	The percentage referred to at Para 7 of the tender will be deducted from/added to the gross amount of the bills for work done after deduction of the cost of materials supplied by the Department.
Clause-32: Claim for Quantities Entered in the Tender or Estimate	Quantities shown in the tender are approximate and no claim shall be entertained for quantities of work executed being either more or less than those entered in the tender of estimate. This is subject to the limitations as provided for in clause 13 and 14 above.
Clause-33: Claim for Compensation for Delay In Starting the Work	No compensation shall be allowed for any delay caused, except as provided under clause 5.3, in starting of the work on any other ground or reasons whatsoever.
Clause-34: Employment of Scarcity Labour	If Government declares a state of Scarcity or famine to exist in any village situated within sixteen kilometers of the work the contractor, shall employ upon such parts of the work as are suitable for unskilled labour, any person certified to him by the Competent authority or by any person to whom the Competent authority may have delegated this duty in writing to be in need of relief and shall be bound to pay to such persons wages not below the minimum which The Government may have fixed in this behalf. Any dispute, which may arise in connection with the implementation of this clause, shall be decided by the competent authority whose decision shall be final and binding on the contractor.
Clause-35: Royalty on minor minerals	The contractor shall pay all quarry, Royalty charges etc, as applicable. If the contractor fails to produce the royalty clearance certificate from concerned department then the MANAGING DIRECTOR shall deduct the royalty charges from his bills and keep in deposit head, which shall be refunded to the contractor on production of royalty clearance certificate from the concerned department. If he fails to produce the royalty clearance certificate within 30 days of submission of final bill, then royalty charges which was keep under deposit head by the MANAGING DIRECTOR shall be deposited to the concerned department and his final bill payment shall be released Any change in the royalty rates of minor minerals notified by the state government, after the date of submission of financial offer by the bidder/contractor, then this increase/decrease in the rates shall be reimbursed/ deducted on actual basis.
Clause-36: Technical Examination	The RSCL shall have the right to cause Audit and Technical Examination of the works and the final bills of the contractor including all supporting vouchers, abstracts etc. to be made as per payments of the final bills and if as a result of such Audit & Technical Examination the sum is found to have been overpaid in respect of any work done by the contractor under the contract or any work claimed by him to has been done under contract and found not to have been executed, the contractor shall be liable to refund the amount of over payment and it shall be lawful for the RSCL to recover the same from the security deposit of the contractor or from any dues payable to the contractor from the RSCL account if it is found that the

	contractor was paid lesser than what was due to him under the contract in respect any work executed by him under it, the amount of such under payment shall be duly paid by the RSCL to the contractor. In the case of any audit examination and recovery consequent on the same the contractor shall be given an opportunity to explain his case and decision of the MANAGING DIRECTOR shall be final. In the case of Technical Audit, consequent on which there is a recovery from the contractor, no recovery, should be made without orders of the Competent Authority whose decision shall be final. AII action under this clause should be initiated and intimated to the contractor within a period of Twenty four months from the date of completion of work.
Clause-37: Death of Permanent Invalidity of Contractor	If the contractor is an individual or a proprietary concern, partnership concern, dies during the currency of the contract or becomes permanently incapacitated, where the surviving partners are only minors the contract shall be closed without levying any damages/compensation as provided for in clause 3 of the contract agreement. However, if competent authority is satisfied about the competence of the surviving, then the competent authority shall enter into a fresh agreement for the remaining work strictly on the same terms and conditions, under which the contract was awarded.
Clause-38: Penalty for Breach of Contract	On the breach of any term or condition of this contract by the contractor, the said RSCL shall be entitled to forfeit the Security deposit or the balance thereof that may at the time be remaining, and to realize and retain the same as damages and compensation for the said breach but without prejudice to the right of the RSCL to recover further sums as damages from any sums due or which may become due to the contractor by RSCL or otherwise howsoever.
Clause-39:	From the commencement of the works to the completion of the same they are to be under the contractor's charge. The contractor(s) is/are to be held responsible for and to make good all injuries, damages and repairs, occasioned or rendered necessary to the same by fire/ natural calamity or any other causes and they are to hold the Corporation harmless from any claims for injuries to persons or for structural damage to property happening from any neglect, default, want of proper care of misconduct on the part of the contractor(s) or any one in his/their employ during the execution of the works.

Dated: **Signature of the Contractor**

Dated:

MANAGING DIRECTOR
RAIPUR SMART CITY LIMITED
Raipur

Annexure- 'A': Model Rules relating to Labour, Water Supply and Sanitation in Labour Camps

NOTE:

These model rules are intended primarily for labour camps which are not of a permanent nature. They lay sown the minimum desirable standard which should be adhered to standards in permanent on semi permanent labour camps should not obviously be tower than for temporary camps.

LOCATION:

The camp should be located in elevated and well drained ground in thelocality. Labour huts to be constructed for one family of 5 persons each. The layout to be shown in the prescribed sketch.

HUTTING:

The huts to be built of local materials. Each hut should provide at least 20 sqm. of living space.

SANITARY FACILITIES:

Latrines and urinals shall be provided at least 15 mtrs. away from the nearest quarters separately for men and women and specially so marked in the following scale.

LATRINES:

Pit provided at the rate of 10 user of families per seat. Separate are required as the privacy can also be user for this purpose.

DRINKING WATER:

Adequate arrangements shall be made for the supply of drinking water. If practicable filtered and chlorinated supplies shall be arranged when supply is from intermittent sources over head storage tank shall be provided with a capacity of five liters a per son per day. Where the supply is to be made from a well is shall confirm to the sanitary standard laid down in the report of the rural sanitation committee. The well should be at least 30 meters. away from any latrine or other source of pollution. If possible the and pump should be installed for drawing the water from well. the well should be effectively disinfected one every month and the quality of the water should be got tested at the Public Health Institution between each work of disinfecting.

BATHING AND WASHING:

Separate bathing and washing plan shall be provided for men and women for every 25 persons in the camp. There shall be one gap and space of 2 sq. for washing and bathing Proper drainage for waste water should be provided.

WASTE DISPOSAL:

Dustbin shall be provided at suitable places in camp and the residence shall be directed to throw all rubbish into those dustbins. The dustbin shall be provided with cover. The contents shall be removed every day and disposed off by trenching.

MEDICAL FACILITIES:

Every camp where 1000 or more persons reside shall be provided with whole time doctor and dispensary. If there are women in the camp a whole time Nurse shall be employed. Every camp where less than 1000 but more than 250 persons resides shall be provided with a dispensary and a part time, Nurse/Midwife. If there are less than 250 persons in any camp a first aid kit shall be maintained in charge of whole time persons trained in first side. All the medical facilities mentioned above shall be for the all residents in the camp, including a dependent of workers, if any, free of costs. For each labour camp there should be qualified sanitary inspector and sweepers should be provided in the following scales :-For camps with strength over 200 but not exceeding 500 persons - One sweeper for every 75 persons above the first 200 for which 3 sweepers will be provided.

For camps with strength over 500 persons - One sweeper for every 100 persons above first 500 for which 6 sweepers should be provided.

Annexure- 'B': Contractors Labour Regulations

The contractor shall pay not less than fair wage to labours engaged by him in the work:

EXPLANATION:

A. 'FAIR WAGES' means whether for time of piece work as notified on the date of inviting tenders and where such wages have not been so notified the wages prescribed by the competent authority for division in which the work is done.

The contractor shall, notwithstanding the provision of any contract to the contrary, cause to be paid a fair to labours indirectly engaged on the work including any labour engaged by his sub-contractor in connection with the said work as if labourers had been immediately employed by him.

In respect of all labour directly or indirectly employed on the works or the performance of his contract, the contractor shall comply with or cause to be complied with the labour Act. Enforce.

The Executive Engineer/Assistant Engineer shall have the right to deduct from the money due to the contractor any sum required or estimated to be required for making good, the loss suffered by a worker or workers by reason of non-fulfillment of the conditions of the contract for the benefit of the workers non payment of the wages or of deductions made from his or their wages which are not justified by their terms of contract or non-observance of regulations.

The contractor shall be primarily liable for all payments to be made under and for the observance of the regulations aforesaid without prejudice to his right to claim indemnity form his sub-contractor.

The Regulations aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this conduct.

The contractor shall obtain a valid license under the contract (Regulation & Abolition) Act, in force and rule made there under by the competent authority from time to time before commencement of work and continue to have a valid license until the completion of the work.

Any failure to fulfill this requirement shall attract the penal provisions of this contract arising out of the resulted non execution of the work assigned to the contractor.

Special Additional Condition:-

Cess@1% (one percent only) shall be deducted at source, from every bill of contractor by Executive Engineer under 'Building and other Construction for workers welfare, cess Act-1996'

It is mandatory for the contractor(s) to get him self/them selves registered with 'Chhattisgarh Building and other Construction Welfare Board' for work amounting to Rs. 10.00 Lacs (Ten Lacs) and above and enclose a true copy of such registration certificate along with the tender, otherwise his/their tender shall not be considered for qualification.

Annexure-'C': Form of certificate on income tax to be submitted by contractor (s)

TENDERING FOR WORKS COSTING Rs. 2.00 LAKHS OR MORE

1. Name & Style (of the company, firm, H.U.F., or Individual) in which the applicant assessed to Income Tax and Address for purpose of assessment.

   The Income Tax Circle/Ward/District in which the applicant is assessed to Income Tax.

   Following particulars concerning the last Income Tax Assessment made:-

   Reference No. (Or G. I. R. No.)of the assessment.

   Assessment year and Accounting year.

   Amount of Total Income Assessed.

   Amount of Tax Assessed I. T., S. T., E. P. T.,B. P. T.

   Amount of Tax paid I. T., S. T., E. P. T.,B. P. T.

   Balance being tax not yet paid and reasons for such arrears.

   Whether any attachment or certificate proceedings ending in respect of the arrears.

   Whether the company of firm of H. U. F. on which the assessment was made has been of is being liquidated, wound up dissolved, petitioned or being declared insolvent as the case may be.

2. The position about later assignment namely, whether returns submitted under section 22(1) or (2) of the IT Act and whether tax. paid under section 18(a) of the Act and the amount of tax so paid or in arrears.

   In case there has been no Income Tax Assessment at all in the past, whether returns submitted under section 21(1) or (2) and 18-A (3) and if so, the amount of Income Tax Return of Tax paid and the Income Tax Circle/Ward/District concerned.

   The name and address of branch (es) verified the particulars set out above and found correct subject to the following remarks.

Dated ...../2014

Signature of I.T.C.
Circle/Ward/District.

Annexure - 'E' : Technical Specifications

Chapter 1 General Information

1.1 Scope of Work

Reorganizaion of distribution network of Gudhiyari & Khamtarai areas, Raipur.

1.1.1 Providing, laying and jointing, testing & commissioning of Distribution Network of total length 45.5 Km with DI K-7 Pipe with dia. From 100mm to 400mm

Details of pipe line as below-

a. 100mm dia.-length 35.23 Km

b. 150mm dia.-length 4.465 Km

c. 200mm dia-length 1.871Km

d. 250mm dia.-length 1.03Km

e. 300mm dia.-length 1.86 Km

f. 350mm dia.-length 0.82 Km

g. 400mm dia.- length 0.23 Km

h. MS Pipe for NH/SH-Crossing-casing pipe of 400mm & 300mm Dia. with 10mm thickness along with 100m length.

1.1.2 Supply, Fixing, Testing & Commissioning of Electromagnetic Flow meter (For Distribution network= 11 nos. with dia. 300 mm and 400 mm) EMF dia. 300 mm -9 nos., dia. 400mm -2 nos.

Preffered Make for Magnetic Flowmeter: Khrone/ Emerson/ Yokogawa/E&H/Equivalant. Prior Approval to be taken from concerened authority with propoer documentation and credentials before procurement during detail engineering time.

1.1.3 Supply, Fixing, Testing & Commissioning of House Service Connection 9,661 nos. (New 8,029 and shifting 1,632=9,619 Connections) (15mm - 9,643 nos., 20mm -13 nos.& 25mm - 5 nos.) without water meter.(Including shifting of Old Connections from Old Pipe line to New Pipe line)

1.1.4 Supply.installation,testing and commissioning of AMR enable waters meters:-

15mm AMR-Multi Jet water meter-11264 nos

20 mm AMR-Multi Jet water meter-21 nos

25mm AMR-Multi Jet water meter-08 nos

Preffered Make for Magnetic Flowmeter: Zener/Itron/Equivalant. Prior Approval to be taken from concerened authority with propoer documentation and credentials before procurement during detail engineering time.

1.1.5 Non SOR Items like MS Specials, Inter connection with existing pipe line, Dismantling of Existing pipes, MS meter box for water meter etc.

The scope of work also includes but not limited to as listed below:

- Road Restoration as per specifications of PWD Chhattisgarh
- Assisting the Engineer in obtaining the statutory clearances from BSNL, PWD, CSEB etc.as required from line departments etc
- All preliminary work such as site clearance in all types of conditions, marking of alignment etc. as described elsewhere in these specifications, for such work no extra payment shall be made to the Contractor. The

Contractor is advised to inspect site before tendering to ascertain the quantum and cost of work and include this cost in their offer.

- Preparatory works such as cross checking of data given for soil conditions and characteristics, L-sections, surveys of alignment of pipeline, valve and appurtenances. locations, existing off shoots, depth of excavation etc for approval of the Engineer
- Excavation of trenches and foundations for all works and other ancillary works in all sorts of strata including refilling of trenches, disposal of surplus soil and site clearance works.
- Earthwork in excavation / Cutting / Dismantling of road crust upto required level for laying of pipes / pipeline including de-watering, removal of soil and disposal.
- Supplying, Lowering, Laying, Jointing of Ductile Iron pipes, pipe specials etc
- Installation of Valves, including fitting, fixtures all complete
- Removal of defects in laying and jointing works of all pipelines, valves and specials till the final commissioning and during the defect notice period.
- Construction of brick masonry valve chambers including base, slab, plastering on walls, placing of pre-cast slab all complete
- Construction of RCC thrust blocks, pipe supporting structures as per drawing and or site conditions etc.
- Placing of reinforcement, formwork for all associated works for RCC.
- Providing House service connection, with all fittings, fixtures etc.
- Supply and Installation of Domestic water meters on new and existing service connections.
- Backfilling in layers, Road restoration, including re-laying of bituminous / concrete roads, as applicable, as per site conditions
- Making inter-connections at various places as per drawings & engineers instruction.
- Hydro-testing of pipelines including Disinfection and commissioning.
- Compliance of all safety rules at work sites
- To take all safe guards to avoid accidents at site, prevent loss/damage to all existing utilities like pipelines, telephone/electric cables, poles etc and any government or private property during the contract period.
- Preparation and submission of “As Built Drawings” for approval of the Engineer-in-charge.
- Liaison with agencies such as CGEB, BSNL, RDA, ULB, PWD and other agencies as necessary so as to carry on with the job smoothly.

The Contractor shall carry out confirmatory Topographic survey including trial trenching (For location of existing utilities), before commencement of the works. In case, the shifting of any existing, water pipe line/ utility is considered necessary by the Department /RAIPUR SMART CITY LIMITED, such service lines will have to be shifted by the contractor for which the payment shall be made for the actual work done as per approved rate.

The contractor shall set up an office with an access to RaipurRAIPUR SMART CITY LIMITED (RSCL) official with proper seating arrangements. The contractor shall provide one AC Bolero/ Scorpio vehicle with driver and POL for inspection work during the entire work period exclusively for RSCL officials.

During the Contract period, the contractor has to procure and install informatory board displacing Name of work (and specific details) at the location given by RSCL at his own cost.

The trial pits/ trenches shall be excavated by the Contractor after mutual agreement and approval of the Engineer along the alignment of the proposed pipelines. The trial pits / trenches including utility survey shall be carried out in advance of the topographic survey for the purpose of satisfying himself as to the location of underground obstructions or conditions.

Necessary permission from the competent authority/ police shall have to be obtained by the Contractor prior to digging up trial trenches/ pits. The Employer may render necessary assistance for getting permission from the different authorities/ police for such excavation. The Contractor shall proceed with caution in any excavation and shall use all means to determine the exact location of underground utilities / structures like water line, sewer lines,

conduits and other utilities etc, in the immediate vicinity thereof prior to excavation. The Contractor shall be solely responsible for the cost of protections or repair or replacement of any structure, water line, sewer line, conduit etc, above or below ground which may be broken or otherwise damaged by these operations.

Trial trench/ pits once excavated shall not be left unattended. Once the underground utilities are identified, the trench and pit shall be filled up and compacted to its original level. Any subsequent depression at this location due to vehicular movement shall have to be made good by the Contractor by filling additional borrowed earth. In any case, no inconvenience is to be caused to the vehicular and pedestrian traffic due to such trial trench excavation. Payment shall be made as per relevant items of the BOQ.

The depth of the trial pit/ trench shall be determined by the invert level of the pipeline as given in the data sheet issued by the Engineer in line with the Tender Drawings or as further instructed by the Engineer. A detailed sketch showing plan and sectional elevation view of the existing underground services, depth of sub-surface water level, type of soil based on visual inspection etc. shall be prepared for each pit/ trench and the same shall be submitted to the Engineer within 7 days. This information will form an input for the selection of alignment of proposed pipeline and production of Construction Drawing by the Contractor for approval by the Engineer.

The lighting, barricading, guarding of the trenches and the provision of watchman shall be done by the Contractor. Some of the roads may be too narrow to provide barricade along the trenches. In such case the location of the barricades etc. shall be finalized by the Contractor in consultation with the Engineer.

Necessary arrangements such as cranes, tripods, chain pulley block for lowering pipes into trench shall be made by the Contractor at his own cost. In no case pipes shall be dropped from a height. All posts and sight rails shall in no case be removed until the trench is excavated, the pipelines are laid and the Engineer gives permission to proceed with the backfilling.

The bedding for pipeline shall be provided as specified in the drawings, standard specifications and or as per direction of the Engineer.

The placement of bought out items and other construction materials during transit and during placement near the alignment shall be done with utmost care so that they are not damaged. Any damage due to these reasons shall be the Contractor’s liability.

All the water lines are to be laid perfectly true to alignment and gradient specified. In case of spigot and socket pipes, the socket end of the pipe line shall face upstream. Properly fitted temporary wooden stoppers shall be provided to close the ends of incomplete water lines. The stoppers shall be removed when pipes are being laid and jointed. Open end of water line at the end of day's work shall be capped and sealed.

Water pipe laying and jointing shall be started and completed only section-wise as per instruction of the Engineer. Hydro-testing / Pressure testing of pipeline shall be done section-wise and as directed by Engineer. The water lines shall be secured in place with approved backfill material tamped under it and proper care shall be taken during tamping at the socket end of the pipe to ensure that it is not damaged.

Backfilling of the trenches and temporary road restoration shall be taken-up immediately after laying of pipes for which payment shall be made as per contract provision. In case work needs to be suspended after excavation of trenches for any reason, the trench shall be backfilled immediately and re-excavated prior to re-commencing the work. No payment shall be made for backfilling/ excavation under such situation. If any portion of the trench needs to be kept open as per instruction of the Engineer, same shall be suitably barricaded.

Installation of valves and pipeline appurtenances shall be taken-up simultaneously with the progress of pipe laying work.

The restoration of road/ footpath shall be done as specified and as per the requirements of the local authorities.

The excess excavated material shall be carried away from the site of works as specified, failing which, in view of public safety and traffic convenience, the Engineer may carry out the work by any other agency at the Contractor’s risk and cost.

The inspection and testing of all the bought out items (Pipes, Valves, Flow-meters etc), both at factory and site shall be carried out in presence of the Employer/ Engineer or his representative unless otherwise directed by the Engineer.

1.2 Preamble to the Specifications

These specifications cover the items of work in structural and non-structural parts of the works coming under purview of this document. All work shall be carried out in conformation with this specification. In general, provisions of Standard Specifications published by Bureau of Indian Standard (BIS) and other equivalent national or international standards have been followed. These specifications are not intended to cover the minute details. The work shall be executed in accordance with best modern practices. All codes and standards referred to in these Specifications shall be the latest revision thereof thirty days prior to the date of submission of bids. In case of discrepancy with the BIS codes the provision in these specifications shall prevail.

The attention of the Contractor is drawn to those Clauses of BIS codes which may require either clarification by the Engineer or the mutual agreement of the Employer and the Contractor. In such cases it is the responsibility of the Contractor to seek clarification on any uncertainty and obtain prior approval of the Engineer before taking up the supply/ construction.

1.3 Measurement and Payment

The methods of measurement and payment shall be as described under various items and in the bill of quantities. Where specific definitions are not given, the methods described in BIS Codes shall be followed.

Should there be any detail of construction or materials which have not been referred to in these specifications or in the bill of quantities and drawings but the necessity for which may be implied or inferred wherefrom, or which are usual or essential to the completion of the work in the trades, the same shall be executed and if such work becomes an extra item of work, in the opinion of the Engineer, then it shall be analyzed by the Engineer and get approved by the Employer for payment to the Contractor.

Unacceptable Work

All defective works shall be demolished, rebuilt and defective materials replaced by the Contractor at his own cost. In the event of such works being accepted at the sole discretion of the Engineer after carrying out necessary repairs etc. as specified by the Engineer, the cost of repairs shall be borne by the Contractor.

1.4 Maintaining Utility Service and Traffic

1.4.1 Project Facilitation

The Employer shall arrange meetings and coordinate with all concerned utility agencies to obtain necessary permission and clearances for execution of the work. The Contractor shall follow-up all matter with such agencies for speedy execution of the work. In the event of any hindrance, the Contractor shall bring the same to the notice of the Employer/ Engineer forthwith.

1.4.2 Protection and Maintaining Utility Services

Almost all the roads where the pipeline works are to be carried out are known to have underground utilities/ services. Drawings of underground services like water pipes, sewers, electric/ telephone cables, gas lines and the like owned by various agencies including Public Undertakings and Local Authorities which are likely to be affected by water supply works are not available and therefore have not been included. The successful bidder shall excavate trial trenches/ pits as directed by the Engineer, to verify exact locations of different utility services. Necessary modifications to the pipeline alignment, may need to be carried out, during the implementation of the works.

The Contractors proposed work program shall include for the period of notice to be given to the authorities seeking permission for diversion/ alterations of utilities and also for actual diversion work and the effects thereof in the works.

No removal or alterations to the utility shall be carried out unless specifically asked by the Engineer-in-charge.

Any service affected by the works shall be temporarily supported by the Contractor who must also take all measures reasonably required by the various bodies to protect their services and property during the progress of the works.

The Contractor may be required to carry out certain works for and on behalf of the various bodies / utility agencies, if so directed by the Engineer-in-charge and he shall also provide, with the prior approval of the Engineer, such assistance to the various bodies as may be authorized by the Engineer.

The work of temporarily supporting and protecting the public utility services during execution of the works shall not be paid extra.

The Contractor may be required to carry out the removal or shifting of certain services/ utilities on specific orders from the Engineer. Such works shall be taken up by the Contractor only after obtaining clearance from the Engineer and ensuring adequate safety measures.

1.4.3 Arrangement of Traffic during Construction

The Contractor shall at all time carry out work on the roads in a manner creating least interference to the flow of traffic while consistent with the satisfactory execution of the same. For all works, the Contractor shall, in accordance with the directives of the Engineer, provide and maintain, during execution of the work, a passage for traffic either along a part of the existing carriageway under improvement, or along a temporary diversion constructed close to the road.

The Contractor shall be responsible for removal of excavated spoils/ silt and other debris without dumping/ stacking the same in huge heaps adjacent to the trench/ site to enable traffic of any form to ply in the area and to enable people to walk on the sides of the trench outside the barricade. The Contractor shall also barricade the trench/ area of activity as directed by Engineer. Deck slabs/ walkway shall be placed at suitable locations across the trench for easy accessibility to adjoining premises as directed by the Engineer.

1.4.4 Traffic Safety and Control

The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights, flagmen and temporary gates as may be instructed by the Engineer-in-charge for the information and protection of traffic approaching or passing through the section of the road under which the pipe shall be laid. Before taking up any construction, an agreed phased programme for the diversion of traffic shall be drawn up in consultation with the Engineer-in-charge.

The barricades erected on either side of the trench/ excavation closed to traffic, shall be as shown in drawing. Under special cases, the Engineer, as per site condition may ask for alternative design for trench barricading from the Contractor for approval without any extra cost. Red lanterns or warning lights of similar type shall be mounted on the barricades at night and kept lit throughout from sunset to sunrise. Fluorescent paint boards or reflective glass boards in red colour shall also be used. Toe guards shall be provided.

At the points where traffic is to deviate from its normal path, the channel for traffic shall be clearly marked with the aid of pavement markings, painted drums or a similar device as per directions of the Engineer. At night, the passage shall be delineated with lanterns or other suitable light source.

One-way traffic operation shall be established whenever the traffic is to pass over part of the carriageway inadequate for two-lane traffic. This shall be done with the help of temporary traffic signals or flagmen kept positioned on opposite sides during all hours. For regulation of traffic, the flagmen shall be equipped with red and green flags and lanterns/ lights.

On both sides, suitable regulatory/ warning signs with gates (if required) as approved by the Engineer shall be installed for the guidance of road users. On each approach, at least two signs shall be put up, one close to the point where transition of carriageway begins and the other at a suitable distance away. The signs shall be of approved design and of reflector type, if so directed by the Engineer.

1.4.5 Maintenance of Diversion and Traffic Control

Signs, lights, barriers and other traffic control devices, as well as the riding surface of diversions shall be maintained in a satisfactory condition till such time they are required as directed by Engineer.

The Contractor shall supply MS boards of requisite number as instructed by the Engineer for traffic diversions, within 30 days from the date of commencement of the project for which no additional payment will be made. Same are to be retained at site till the project is substantially completed and the Engineer gives permission to remove those from site. Damages caused to the sign boards for any reason whatsoever shall be either repaired or replaced immediately for which no separate payment will be made.

1.4.6 Access to Abutting Properties and Cross Traffic Flow Arrangement

For the entire duration of the works the Contractor shall at all times provide convenient access to paths, steps or drives for all entrances to property abutting the site and maintain them clear, tidy, and free from mud and objectionable matter.

In addition to the above, in order to ensure uninterrupted traffic flow in the cross roads, the Contractor shall have to provide and maintain suitable crossing arrangement for the existing traffic to move across the construction work for all categories of road crossings under which pipe laying will be in progress.

1.4.7 Measurement and Payment

For the items above no additional payment shall be made to the Contractor. The Construction for traffic diversion, traffic control is integral to the works and no separate payment shall be made on account of any such activities.

1.5 Methodology and Sequence of Work

Prior to start of the construction activities at site, the Contractor shall, within 28 days after the date of the Letter of Acceptance, submit to the Engineer for approval, the detailed construction methodology including mechanical equipment proposed to be used, sequence of various activities and schedule from start to end of the project. The methodology and the sequence shall be so planned as to provide proper safety, and free flow of traffic.

1.6 Procurement of materials

The quantities given in the BOQ may vary according to actual site conditions. The Contractor shall in no case order/ procure the materials for the total quantity as per the BOQ. The Contractor shall reassess the quantity of different materials required in discussion with the Engineer and arrange to order and procure them in phases well in advance but commensurating with the progress of work. All surplus materials shall have to be taken back by the Contractor. No payment will be admissible to the Contractor on account of surplus materials.

1.7 Completion (As Built) Drawings

The construction drawings shall be updated along with the progress of construction work and all modification and changes are to be incorporated in these drawings. The modified drawings shall be termed “As-Built drawings”, which are to be submitted by the Contractor to the Engineer. These “as-built drawings” shall among other details, include layout plan, long section of the pipeline as laid, including cross-section of the pipeline along major junctions canal / railway crossings etc and “as-built drawings” of the appurtenant structures.

The Contractor shall submit ‘Completion Drawings’ to the Engineer progressively within one month of actual completion of each section /segment of pipeline, as laid, tested and after trial run. These drawings and reports shall be accurate and correct in all respects and shall be checked and approved by the Engineer. The completion drawings shall be provided by the Contractor section / segment-wise for the pipeline network, as laid. The drawings are to be submitted soft as well as hard copies in A1 size sheets or as directed by the Engineer.

The drawings are to be submitted duly signed by the Contractor. Taking over certificate of the works shall not be issued by the Engineer in the event of Contractor’s failure to submit the aforesaid “As-built drawings” for the entire works. No separate payment shall be made for preparation and submission of “As-built drawings” by the Contractor.

Chapter 2 Specification for Pipes and Specials

2.1 Supply and laying of Ductile Iron Pipes

2.1.1 Scope of Work

This scope covers the requirements for manufacturing, stacking, testing, supplying, jointing of Ductile Iron (DI) pressure pipes, fittings and specials used for water supply system (Distribution system / pumping mains). The pipes may be socket-spigot type or double flanged type or a combination of both.

All DI pipes should be internally in lined with cement mortor and externally out coated with metallic zinc coating having finishing layer as indicated in Annexure A, as per IS 8329.

2.1.2 General Requirements

The pipes will be centrifugally cast (spun) Ductile Iron pipes for Water Supply confirming to the IS 8329: 2000. The pipes used will be either with push on joints or flanged joints. EPDM rings / gaskets shall confirm to IS: 5382 and shall be supplied by the manufacturer of the pipes.

The pipes will be supplied in standard length of 5.00 / 5.50 / 6.00 meters length with suitably rounded or chamfered ends. Each pipe of the push on joint variety will also be supplied with EPDM gasket. Any change in the stipulated lengths will be approved by the Engineer – in charge.

The manufacturing, testing, supplying, laying, jointing and testing at work sites shall comply with all currently applicable statutes, regulation, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases the latest revision of the standards/ codes shall be referred to. If requirements of this specification are at variance with the requirements of the standards/ codes, this specification shall govern.

Code No.:	Title / Specification
IS:5382	Specification of rubber sealing rings for gas mains, water mains and sewers
IS:8329	Centrifugally cast (spun) ductile iron pressure pipes for water, gas and sewage – Specification
IS:9523	Ductile iron fittings for pressure pipes for water, gas and sewage – Specification
IS:12288	Code of practice for use and laying of ductile iron pipes

Other IS codes not specifically mentioned here but pertaining to the use of DI pipes and fittings form part of these specifications.

Equivalency of Standards and Codes

Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be acceptable subject to the Engineer's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer at least 28 days prior to the date when the Contractor desires the Engineer's approval. In the event the Engineer determines that such proposed deviations do not ensure equal or higher quality, the Contractor shall comply with the standards specified in the documents. Water quality analysis with respect to potable water supply standards as per IS, if not available equivalent standards to be followed as desired by the Engineer

2.1.3 Storage and Stacking of DI pipes

DI pipes shall be unloaded on level ground. The stacking area must be flat and it must not contain any corrosive material and suitable approach road for vehicles. During stacking and removal operations, safe access to the top

of the stack is essential. Pipes should be stacked on a base of raised wooden battens at least 100 mm. thick and 225 mm. wide.

To avoid any damages to the internal coating of the pipes, shaped hooks covered with special protection of plastic material or rubber should be used. The bottom layer of pipes should be securely anchored. The following types of stacking are recommended:

- Square stacking: Up to and including DN 400
- Parallel stacking using timber: Suitable for pipes of all sizes
- Pyramid stacking: Suitable for pipes of all sizes

The preferred stacking height is as stated follows:

Pipe Dia. (mm)	150	200	250	300	350/400	450/500	600
No. of layers	14	12	10	8	7	6	4

The pipes shall be stacked at locations identified by the Contractor with prior intimation and consent of the Engineer. No extra payment shall be made to the Contractor for carriage of pipe from the factory to the stack-yard or from the stack-yard to the work site.

2.1.4 Inspection and Testing

The pipes will be subjected to following tests for acceptance:

1. Visual and dimensional check as per Clause 13 and 15 of IS 8329
2. Mechanical Test as per Clause 10 of IS 8329
3. Hydrostatic Test as per Clause 11 of IS 8329
4. The test reports for the rubber gaskets shall be as per acceptance tests of the IS 5832.

The sampling shall be as per the provisions of the IS 8329

2.1.5 Marking

All pipes will be marked as per Clause 18 of IS 8329 and show as below:

- Manufacturer name/ stamp
- Nominal diameter
- Class reference
- A white ring line showing length of insertion at spigot end

2.1.6 Joints and Lubricants

The lubricants shall assist to easily slide the pipe without any damage to sealing rings and shall not have any effect known to be harmful to health and shall be resistant to bacterial growth. The lubricant shall be supplied by the manufacturer of the pipe. The lubricant has to have the following characteristics:

(a) must have a paste like consistency and be ready for use

(b) has to adhere to wet and dry surfaces of DI pipes and rubber rings

(c) to be applied in hot and cold weather; ambient temperature 0 - 50 °C, temperature of exposed pipes up to 70 °C

(d) must be water soluble

(e) must not affect the properties of the drinking water carried in the pipes

(f) must not have an objectionable odour

(g) has to inhibit bacterial growth

(h) must not be harmful to the skin

(i) must have a shelf life not less than 2 years

Acceptance tests shall be conducted in line with the provisions of the IS 9523

2.1.7 Laying and jointing

Pipe laying and jointing shall confirm to the requirements of IS: 12288.

Pipes should be lowered into the trench with tackle suitable for the weight of pipes. For smaller sizes, up to 200 mm nominal bore, the pipe may be lowered by the use of ropes but for heavier pipes suitable mechanical equipment have to be used.

All construction debris should be cleared from the inside of the pipe either before or just after a joint is made. This is done by passing a pull-through in the pipe, or by hand, depending on the size of the pipe. All persons should vacate any section of trench into which the pipe is being lowered

On gradients of 1:15 or steeper, precautions should be taken to ensure that the spigot of the pipe being laid does not move into or out of the socket of the laid pipe during the jointing operations. As soon as the joint assembly has been completed, the pipe should be held firmly in position while the trench is back filled over the barrel of the pipe.

The designed anchorage shall be provided to resist the thrusts developed by internal pressure at bends, tees, etc. Where a pipeline crosses a watercourse, the design and method of construction should take into account the characteristics of the watercourse to ascertain the nature of bed, scour levels, maximum velocities, high flood levels, seasonal variation, etc. which affect the design and laying of pipeline. The assembly of the pipes shall be made as recommended by the pipe manufacturer and using the suitable tools.

The socket and spigot ends of the pipes shall be brushed and cleaned. The chamfered surface and the end of the spigot end has to be coated with a suitable lubricant recommended by the manufacturer of the pipes. Oil, petroleum bound oils, grease or other material which may damage the rubber gasket shall not be used as lubricant. The rubber gasket shall be inserted into the cleaned groove of the socket. It has to be checked for correct positioning.

The two pipes shall be aligned properly in the pipe trench and the spigot end shall be pushed axially into the socket either manually or with a suitable tool specially designed for the assembly of pipes and as recommended by the manufacturer. The spigot has to be inserted up to the insertion mark on the pipe spigot. After insertion, the correct position of the socket has to be tested with a feeler blade. Deflection of the pipes -if any- shall be made only after they have fully been assembled. The deflection shall not exceed 75 % of the values indicated by the pipe manufacturer.

2.1.8 Hydraulic testing of pipes

After laying and jointing the pipeline shall be tested for tightness of joints, in sections approved by the Engineer in Charge. The length of the sections shall be decided based on the topographical conditions. Preferably the pipeline stretches to be tested shall be between two chambers (air valve, scour valve etc).

The water required for testing shall be arranged by the contractor himself. The Contractor shall fill the pipe and compensate the leakage during testing. The Contractor shall provide and maintain all requisite facilities, instruments, etc. for the field testing of the pipelines. The testing of the pipelines generally consists in three phases: preparation, pre-test/saturation and test, immediately following the pre-test.

Following steps are to be followed which shall be monitored and recorded in a test protocol if required:

- Complete setting of the thrust blocks, with partial backfilling and compaction to hold the pipes in position while leaving the joints exposed for leakage control.
- Opening of all intermediate valves (if any) and fixing the end pieces for tests and after temporarily anchoring them against the soil (not against the preceding pipe stretch)

- at the lower end with a precision pressure gauge and the connection to the pump for establishing the test pressure
- at the higher end with a valve for air outlet
- If the pressure gauge cannot be installed at the lowest point of the pipeline, an allowance in the test pressure to be read at the position of the gauge has to be made accordingly
- Slowly filling the pipe from the lowest point(s).
- Complete removal of air through air valves along the line and closing all air valves and scour valves.
- Slowly raise the pressure to the test pressure while inspecting the thrust blocks and the temporary anchoring.
- Keeping the pipeline under pressure for the duration of the pre-test / saturation of the lining by adding make-up water to maintain the pressure at the desired test level. Make up water to be arranged by Contractor himself at his own cost.

After pipeline is completely filled it shall remain to stay for minimum period of 18 hours for the cement mortar lining to absorb water to its saturation point. Before the pressure test refill the pipeline to compensate the absorb quantity and gradually pressurize the pipeline so that it reaches the required test pressure and allow to stabilize at the test pressure.Record the water added and the pressure in intervals of 15 minutes at the beginning and after 2 hours at the end of the test period. Without any additional requirement of make-up water, the test pressure should not fall more than 0.2Kg/cm2 at the end of one hour.

Pipes shall be given different hydraulic tests for ensuring quality of manufacture as per provision of IS: 8329.

No section of the pipe-work shall be accepted by the Engineer-in-charge until all requirements of the test have been obtained.

2.1.9 Disinfection of mains

After completion of pipe laying work in a stretch and before commissioning, disinfection of pipelines is to be carried out by the contractor. The pipeline shall be flushed prior to disinfection. After initial flushing, the hypochlorite solution shall be applied to the water main with mechanically or electrically powered chemical feed pump designed for feeding chlorine solutions. The water from the existing system or other approved source of supply shall be made to flow at a constant measured rate into the newly laid pipeline. The water shall receive a dose of chlorine also fed at a constant measured rate.

Whole network is to be disinfected section wise by filling the pipelines with water containing appropriate strength of chlorine compound (20mg/l approx.), allowing it to stand for 18 to 24 hrs. As the chlorinated water passes through tees, valves, hydrants shall be operated so as to disinfect the appurtenances.

Thorough flushing of the pipelines should also be carried out after the disinfection procedure is over. The chlorinated water shall be flushed from the pipeline until the chlorine concentration in the water leaving the pipeline is no higher than that generally prevailing in the system.

However, if situation demands less time, then the strength of disinfectant may be increased with corresponding lesser contact time. This will be decided by the Engineer in charge.

After final flushing and before the water pipeline is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriological quality and shall show the absence of coliform organisms. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory results are obtained. This will be done without any additional cost.

2.1.10 Measurement Pipes, Specials and Payment

The length of pipe shall be measured in running meter correct to a centimeter for the finished

Work measured along the center line of pipe excluding of specials and excluding of valves and its specials like tail pieces, dismantling joints etc. Specials will be measured separately and separate payment for the same shall be made.

The rate to including cost of supply, laying and jointing of pipes including EPDM gasket and Factory (Third Party testing) / Field Hydro-testing, including labour and all associated works as per specification and direction of the Engineer-in-charge for completing the job.

2.2 Supply and Laying of Ductile Iron Fittings

2.2.1 Scope

The scope covers the general requirements for Ductile Iron (DI) fittings suitable for Tyton / flanged joints to be used with DI / CI / MS pipes and or for interconnecting to valves, flow-meters, fire hydrants etc. The item relates to providing and fixing of DI fittings and specials for interconnection with the existing system and or new system with DI / CI / MS (or any PE) pipes and pipeline appurtenances, including testing and commissioning all complete. DI specials to be used shall be of the same diameter as the pipeline to which it is fixed unless mentioned otherwise. The DI pipe fittings shall confirm to IS: 9523.

The external coatings shall be applied with zinc rich paint with finishing layer as included in Annexure “A” of IS 9523:2000.

2.2.2 General Requirements DI Fittings

All DI fittings shall be of class K-12. DI fittings shall be manufactured and tested in accordance with IS: 9523 and shall include the following types of specials:

- Flanged socket / spigot
- Double socket bends (90^0, 45^0, $22½^0$, $11¼^0$)
- double socket branch flanged tee
- All socket tee
- Double socket taper
- All Flanged Tee
- Flanged Socket and Spigot
- Mechanical collar joint
- Duck foot bend

All flanges of all ductile iron products shall be of integrally cast type or screwed or factory welded (flanges are welded at the point of manufacture under factory conditions with inspection agency certification) complete with all nuts, bolts, gaskets and two washers per bolt unless otherwise stated.

Nuts, bolts and washers for flanged joints shall be of high tensile steel and shall comply with BS EN 14399 – Part II – 2005. The bolting shall be comply with ISO 2531(2009) or BS EN 1092-2.

Restrained joints are required to avoid settlement in weak soil area without thrust blocks and shall comply with ISO 10804-1 or equivalent. Rubber gasket for these joints shall be of neoprene rubber with ductile iron locking rings, nuts and bolts.

2.2.3 Supply of EPDM Gasket

All the DI fittings shall be supplied with EPDM rubber rings. Flanged fittings shall be supplied with EPDM gasket per flange and the required number of nuts and bolts. The EPDM ring / gaskets shall conform to IS: 12820 and IS: 5382.

DI fittings shall be properly packed with jute cloth. EPDM rings shall be packed in polyethylene bags. EPDM rings in PE bags and nuts, bolts etc. shall be supplied in separate jute bags.

2.2.4 Measurement and Payment

Measurement shall be as specified in BoQ.

The rate to include cost of supplying, laying, jointing of pipe specials and fittings (flanged / Tyton joints) including Factory (Third Party testing) / Field Hydro-testing, including labour and all associated works as per specification and direction of the Engineer-in-charge for completing the job.

2.3 Mild Steel Pipes

2.3.1 Scope of Work: The scope of work involves laying of MS pipe as part of the clear water mains network. The pipeline segment, maybe laid below rail lines / culvert crossing etc as maybe required for site condition and or direction of the Engineer-in-charge.

2.3.2 Applicable Standard and Codes: Following standards shall be referred for manufacture of M. S. pipes. In all cases, latest revision of the standards / codes shall be referred to. If requirements of this specifications conflict with the requirements of the standards / codes, this specification shall govern.

Code No.:	Title / Specification
IS: 3589:	Seamless / electrically welded steel pipes for water, gas, sewage – specification.
IS: 4853:	Recommended practice for Radiographic inspection of fusion welded butt joints in steel pipes.
IS: 4260:	Recommended practice for ultrasonic butt weld in ferric steel.
IS: 3600: (Part-1)	Methods of testing fusion welded joints and weld mains in steel: part 1 cruciform fillet weld tensile test
IS: 4711:	Sampling of pipe for various tests and criteria for conformity.
IS: 1894:	Methods of tensile testing of steel tubes.
ISO: 18286	Hot-Rolled stainless steel plates – Tolerances on dimensions and shape – International Organization for Standardization.

2.3.3 Grade and composition of Steel

Mild steel used for manufacture of the pipes (HR coils) shall confirm to IS: 2062, grade-B or IS: 10748 grade – 3 or equivalent ISO. The dimensions of HR coils shall confirm to IS: 2062. The quality of steel, chemical composition and tensile strength of the steel plates shall be as specified in IS: 3589. Unless, specified otherwise, Mild Steel pipes shall be spirally welded manufactured through submerged arc welding, confirming to IS: 3589, confirming to Grade Fe 410.

The pipes shall be manufactured from steel plates, butt welded spirally by automatic submerged arc welding process using at least two runs, one of which shall be on the inner side of the pipes. Welding shall be so done that there will be through fusion and complete penetration and shall be free from cracks, oxides, and slag inclusion and gas pockets.

All plates shall be tested by ultrasonic equipment to check for manufacturing defects such as voids layers etc. The contractor shall supply test certificate to this effect from the manufacturer. The contractor shall also supply certificate for chemical composition of the plates used, from the manufacturer.

2.3.4 Standard Length of Pipes

The pipes shall be manufactured in lengths of 9 to 12m with beveled ends. Length of each pipe shall be measured at diametrically opposite four places and average of the four measured lengths shall be considered for measurements of pipe length.

2.3.5 MS Specials and Fittings

MS specials as required shall be fabricated on site by cutting the pipes as required. Flanged specials shall be with standard flange dimensions and thickness as specified under relevant IS Standard.

2.3.6 Cutting of Steel Pipes

If required, the MS pipe that is to be procured from approved manufacturer shall have to be cut into smaller lengths to facilitate butt welding of joints from inside or outside. The pipes shall be laid in lengths of 9m to 12m as received from supplier as far as possible. They will require cutting in only special circumstances as listed below:

If the length of a section is such that it cannot be covered only by full length pipes then only will cutting of pipes is to be done with prior consent from the Engineer.

The methodology to be adopted for cutting should ensure that the cuts are clear. The ends of such pipe segments shall be required to be bevel edged outside to facilitate butt welding of joints circumferentially outside after laying. The Contractor's financial offer should include the cost of cutting full length pipes into smaller lengths along with bevel edging to suit butt welding of joints with all elements of cost of materials, labour and equipment. No additional payment will be made on this account.

2.3.7 Transportation of Pipes / Pipe segments to the Site

Procurement of pipes shall be done only from reputed manufacturers with consent from the Engineer. The Contractor shall transport the internally lined and externally coated pipes with epoxy to his depot/ workshop to carry out operation of cutting into smaller segment lengths, if required, edge preparation by providing reverse bevel for butt welding from inside the pip. The Contractor shall be responsible for any damage to the steel pipes or lining and coating during loading, unloading and handling the same at own depot/ workshop and at site. Rectification of the damage, if any, shall be done by the Contractor at his own depot/ workshop and at site. The pipes should be stacked as per standard practice over proper supports in the Contractor's depot. The inside of pipes should be kept free of dirt and debris. The Contractor's financial offer shall include the cost of the transportation of pipes at various stages of work.

The Contractor shall arrange to transport all pipes/ pipe segments from his depot to work site in the alignment where they are to be laid. The Contractor should take proper care to ensure that there is no damage to the pipes/ pipe segments including the protective coating inside and outside, during loading at his depot, transit and unloading and stacking at site. Damage, if any, shall be required to be rectified by the Contractor at his cost. The Contractor's financial offer shall include the full cost of transport of the pipes and pipe segments with all the elements of loading, transport, unloading and stacking at site of work.

2.3.8 Internal and External Coating of lining and coating

Epoxy lining and coating is proposed for internal and external surfaces of the MS pipes, both Factory applied. Thickness of internal lining shall be 430 micron and external coating 600 micron. First coat shall be a primer coat followed by two or more coats of epoxy to achieve the required thickness.

The lining and coating shall have one coat of two-part, chemically cured inhibitive Epoxy primer and two coats of a different two-part, chemically cured, solvent free, and spray applied epoxy paint. The lining and coating system shall meet the performance requirements of AWWA C-210 standard.

Prepared surfaces must be completely cleaned of dust and dirt by brush or vacuum cleaner and shall be thoroughly dry. Coating shall not be applied in the following atmospheric conditions.

- Relative humidity exceeding 85%
- When the surface to be coated is less than 3^0C above the due point
- The surface temperature is less than 7^0C or greater than 50^0C.

Successive coats

After application of the first coat, the next coat shall be applied within the time limits, surface conditions, and temperature recommended by the manufacturer.

Coating thickness

Final thickness of the internal lining shall not be less than 430 micron DFT and that of external coating 600 micron DFT. The lining and coating shall be applied leaving 15 cm at the edge of pipes / specials for welding of the joint. Coating on this portion shall be applied after welding the joint.

Preheating

The temperature of mixed lining and coating and that of the pipe at the time of application shall not be lower than 10^0C. Preheating of the coating material, the use of inline heaters to heat the coating material; or heating of the pipe, fittings or specials may be used to facilitate the application. Heating shall confirm to the recommendations of the coating material manufacturer.

Touch up and repair procedure

The finished lining and coating shall be inspected for damage or reduced thickness. Any such areas shall be repaired by thoroughly degreasing the surface and abrading using 180 grade abrasive papers, the abraded areas shall extend from the edge of the damage for 50–75 mm on to surrounding sound coating. The prepared surface can then be re-coated.

Final curing

Sufficient curing period shall be allowed after application of the lining and coating as per AWWA C-203 standards to gain required strength. The epoxy applied pipes; specials shall be stored for curing in accordance with the durations given in the following table.

Ambient Temperature, (deg C)	45	40	35	30	25	20	15	10	7*
Minimum number of days storage	1	1	2	4	5	7	11	17	22

*Minimum possible cure temperature

Electrical inspection for continuity

After curing, the lining and coating shall be tested for holidays according to the procedures and using the voltage settings. Any holidays indicated by the detector shall be got repaired.

Coating of joints after welding

The joint portion shall be cleaned thoroughly as stated above from inside and outside and lining and coating shall be applied in required coats for same thickness.

2.3.9 Welding of Joints of Steel Pipes

The electrodes used for welding of steel plates shall confirm to IS: 814. The following Indian Standards (Latest edition) would be referred while taking up the welding joints of the pipes.

Code No.:	Title / Specification
IS:228	Methods of chemical analysis of steel
IS:813	Scheme of symbols for welding
IS:814	Covered electrodes for manual metal arc welding of carbon and carbon manganese steel – Specification
IS:1082	Specification for equipment for eye and face protection during welding
IS:1599	Method for bend test

Code No.:	Title / Specification
IS:1608	Mechanical testing of metals – Tensile testing
IS:1757	Method of charpy impact test (V notch) for metallic material
IS:2328	Method of flattening test on metallic tubes
IS:2825	Code for unfired pressure vessels
IS:3589	Steel pipes for water and sewage (168.3 to 2540 mm outside diameter) – Specification
IS:3600	Method of testing fusion welded joints and weld metal in steel
IS:3803	Steel – Conversion of elongation values
IS:4711	Methods of sampling of steel pipes, tubes and fittings

2.3.10 Welding Procedure

Spirally welded (SAW) steel pipes as per IS:3589 of grade Fe 410, are to be joined circumferentially with outside welding. Prior to joining the pipes edge preparation (beveling) is to be done as per IS:3589to facilitate buttwelding. Oxy-flame cutting/ bevel cutter can be used for the purpose of edge preparation. The quality of welding should be of radiographic standard. After completion of welding the welding zone is to be cleaned free from dirt, dust oil etc. and protective coating applied as per recommended scheme, both inside and outside.

In order to ensure better efficiency and eliminate possibilities of rejection, it is absolutely necessary to establish the weldability of the material by the particular welding process. For this particular job the MIG/ MAG filler rod should be used compatible for higher deposition rate, less consumption of wire, low spatter with shine weld bead, better striking rate and mechanical property. The weld puddle should be easily controllable with a fast freezing slag system, which is easily removable and should give excellent bead profile and ease of operation. It is recommended to use high cellulose coated, potassium base wire for pipe welding in DC, as well as AC operation. The wire should give complete penetration and smooth weld bead and should be of a radiographic quality.

Shielding gas (agro shield) Ar- 75% - 80% & Co2- 25% - 20% is to be used for better performance and to minimize human hazard while welding is in progress. Minimum number of passes required is Root + Three (1+3).

A semi-automatic gas shielded metal arc welding MIG/ MAG machine with inverter technology is to be used, which should comprise of power source and wire feeder. The machine should have the characteristics of stable welding process, low spatter and compatible to all position welding of common low carbon steel.

The MIG/ MAG equipment for welding should possess the following features :

1. Soft-start ignition
2. Adjustable Arc force, crater current, voltage, welding current and voltage
3. 4 step welding modes switch
4. Welding voltage and welding current should be able to be pre-set and displayed digitally
5. Fast-feed spot
6. Protective measures for over-heat, over-current, under-voltage and power phase absence etc.
    - **Handling of pipes and specials**

    During manufacturing and during the entire period of the application of concrete or mortar lining protection and the curing thereof, the section shall be carefully supported and handled so as to avoid injury to the fresh lining. If a pipe section must be rolled or otherwise moved, such operation shall be done slowly and with every reasonable precaution against damage. Any portion of the lining, coating that may become damaged shall be cut and replaced. During delivery, all sections shall be handled by such means and in such a manner that no
    Distortion or damage is done to the protection or to the section as a whole

2.3.11 Storage of wires

Although welding wires and rods do not have a flux coating, poor storage condition can be detrimental to the

performance and shelf life of the product. Inadequate storage condition can lead to surface rusting or contamination of the wire, such that feedability and diffusible hydrogen levels are adversely affected. Wires should not be left on the machines or out of the stores for prolonged periods especially overnight, as condensation of moisture from the atmosphere may lead to rapid surface deterioration. The wire should always be replaced in original packaging and returned to the controlled storage. Ideal storage conditions are 20^0C above external air temperature and 0 to 60% humidity.

2.3.12 Non-destructive Test and Hydraulic Testing of Pipes

Pipe string after welding should be tested with NDT and hydraulically. The lengths of sections to be tested shall be decided by the Engineer. Arrangements for isolating such section for carrying out the tests and for removal of the end plates once the testing is over form an important part in the scope of work of the Contractor. The hydraulic Test is to be carried out as per specifications given below. Payment will be made as per contract provisions.

2.3.13 Hydraulic Testing of Pipe System

For hydraulic testing of pipe system the standard procedure as indicated in CPHEEO Manual on Water supply and Treatment issued by the Ministry of Urban Development, Government of India is to be followed. Preliminaries as specified under DI pipeline hydraulic testing specifications shall be done prior to starting filling of the pipeline.

The field test pressure to be imposed should be not less than the maximum of the following:

a) 1½ times the maximum sustained operating pressure

b) 1½ times the maximum pipeline static pressure

c) Sum of the maximum sustained operating pressure and the maximum surge pressure

d) Sum of the maximum pipeline static pressure and the maximum surge pressure, subject to a maximum equal to the works test pressure for any pipe fittings incorporated

The field test pressure should wherever possible be not less than 2/3rd of works test pressure appropriate to the class of pipe and should be applied and maintained for at least four hours. If the visual inspection satisfies that there is no leakage, the test can be passed.

The maximum sustained test pressure is 5 kg/cm2, the maximum pipe line static pressure (sum of pressure of pumps) is 7.5 kg/cm2 and surge pressure due to water hammer is 23 kg/cm2.

Where the field test pressure is less than 2/3rd of the work test pressure, the period of test should be increased to at least 24 hours. The test pressure shall be gradually raised at the rate of 1 kg/cm2/min. If the pressure measurements are not made at the lowest point of the section, an allowance should be made for the difference in static head between the lowest point and the point of measurement to ensure that the maximum pressure is not exceeded at the lowest point. If a drop in pressure occurs, the quantity of water added in order to re-establish the test pressure. The quantity of water added should be carefully measured. This should not exceed 0.1 litre/mm of pipe diameter/km of pipeline/day for each 30 metre head of pressure applied.

The hydrostatic test pressure at works and at field after installation and the working pressure for different pipes materials should be as given in Appendix 6.4 of the CPHEEO Manual on Water Supply and Treatment.

The allowable leakage during the maintenance stage of pipes carefully laid and well tested during construction, however, should not exceed :

$q_L = (ND \sqrt{P})/115$
Where,

q_L = Allowable leakage in cm^3/hour

N = No. of joints in the length of pipe line

D = Diameter in mm

P = Average test pressure during the leakage test in kg/cm^2

Where any test of pipe laid indicates leakage greater than that specified as per the above formula, the defective pipe(s) or joint(s) shall be repaired/ replaced until the leakage is within the specified allowance.

- **Specification, Inspection and Testing**

The pipes will be subjected to following tests for acceptance:
IS: 8329 centrifugally cast (spun) ductile iron pressure pipes for water, gas and sewage.
IS: 9523 Specification for DI fittings for pressure pipes for water, gas, and sewage.
BS: 4772 Specification for DI fittings
IS: 5382 Specification for Rubber Gasket for push in joints for pipes.
IS: 12820 Dimensional requirements for rubber gaskets for mechanical joints and push on joint for use with cast iron/ D.I. pies and fittings for carrying water, gas and sewage.
IS: 12288 Code of practice for use and laying of ductile iron pipes
IS: 1363 Hexagon head bolts, screws and nuts of product grade A and B (part:1-5)
IS: 3624 Pressure and vacuum gauges
IS: 341 Black Japan, types A, B and C
IS: 9862 Ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water and chlorine resisting.
The flanged joints will conform to the Clause 6.2 of IS 8329. The pipe supply will also include one rubber gaskets for each flange. Inspection and Testing The pipes will be subjected to following tests for acceptance:

- Visual and dimensional check as per Clause 13 and 15 of IS 8329
- Mechanical Test as per Clause 10 of IS 8329
- Hydrostatic Test as per Clause 11 of IS 8329
- The test reports for the rubber gaskets shall be as per acceptance tests of the IS 5382 and will be in accordance to Clause 3.8
  The sampling shall be as per the provisions of the IS 8329

2.3.14 Measurement and Payment of MS pipes

Measurement for 'as laid' pipes shall be measured along the centre line including fabricated MS pipes, specials, tees, bends, branches but excluding valves or other pipeline appurtenances. The rate to include Supply, lowering, laying of MS pipes, including fabricated specials and fittings all complete as per drawings, technical specification including direction of the Engineer-in-charge.

2.4 National Highway Crossing

Before start the HDD the work contractor has to do the ground penetrating radar survey.

Conducting ground penetrating radar survey in a corridor of 4 to 6m width to detect buried utilities like pipes, cables etc. in such corridor including marking of the detected utilities on the map of corridor with information of locations and depths to the top of various utilities detected. Work to be conducted using 500MHz and 300 MHz antenna for best possible resolution and penetration for road crossings without dividers and up to 30m width, all complete as specified in the tender document and as per direction of Engineer-in-charge.

Chapter 3 Specification for Valves and Apputenances

The manufacturer shall submit their Quality Assurance Plan for the Engineer's approval including the inspection and tests which are to be carried out at the manufacturer's works, for all valves and appurtenances.

All the major components of each valve shall be physically and chemically tested by approved independent testing authority to confirm the material quality. The manufacturer shall intimate the Engineer the relevant standard to be followed for testing. All components subject to testing shall be identified and only those which are tested successfully shall be used for the manufacture of final product. All test results shall be submitted for the Engineer's approval. Material test certificates of valve components shall be furnished before dispatch.

The pressure retaining components of all valves shall be tested at the pressure stipulated in the relevant standard followed. The manufacturer shall inform the Engineer regarding the pressure ratings of the valves and all the test certificates to be submitted before dispatch of the materials.

Unless, specified otherwise, the pressure rating of all valves to be supplied and installed shall be PN-1.0 (10 kg/cm2).

3.1 Butterfly Valves

3.1.1 Scope

The scope covers manufacture, supply, and installation of Butterfly valves confirming to IS: 13095/ BS: 5155/ DIN: 3354/ AWWA-C-504, suitable for bi-directional flow. The flanges and their dimensions of drilling shall be in accordance with IS: 1538 (part-I to XXII).

3.1.2 General Requirements

The valves will operate smoothly and steadily in both the direction, free from flow induced vibration. The valves will be provided with light shut-off closures suitable for frequent operation. The valve disc will rotate 90^{o} from full open to full close and is suitable for throttling duty also. The valves will be of double flanged ends and the body will be provided with lifting lugs.

The valve disc will be of solid streamlined slab design with no ribs. The seat ring will be replaceable type and will be bolted on the body. The rubber seal on the disc will be easily replaceable type to facilitate removal at site. The seat design shall be of non-jamming and self-cleaning type. The valves shall be manufactured with integral body seats, suitable for open-closed and throttling service. Each valve shall be capable of withstanding the rated pressure from either side.

The valves, where specified shall be electrically (motor) operated. Valves on pump discharge piping and primary mains shall be furnished with extension spindles. The extension spindle shall be furnished with a universal coupling and intermediate supports. Electric actuators mounted shall be mounted on floor stands at floor level. Butterfly valves with motor operators shall be mounted with the valve stem facing horizontally.

Butterfly Valves to be installed on mains shall be of the metal seated type generally as per BS EN 593. Butterfly Valves to be installed in the discharge piping of pumps shall have seat of elastomer (EPDM rubber) seats as per IS 1309 and AWWA C504 (Resilient Seated Butterfly Valves). Valves shall be suitable for mounting in any position. The valve seat shall be of integrally cast and of replaceable design. When the valve is fully closed, the seal shall seat firmly. The seat surfaces shall be machined smooth to provide a long life for the seal. All fasteners shall be set flush so as to offer the least possible resistance to the flow through the valve. All valves shall be suitable for throttling purpose.

All valve spindles and hand wheels shall be positioned to give good access for operational personnel. Valve of diameter 400 mm and above shall be provided with an enclosed gear arrangement for ease of operation. The gearing shall be such that the valve can be opened and closed by one man against an unbalanced head of 1.15 times the specified rating. Valve and gearing shall be such as to permit manual operation in a reasonable time and not exceed a required rim pull of 80 N. All hand wheels shall be arranged to turn in a clockwise direction to close the valve, the direction of rotation for opening and closing being indicated on the hand wheels.

3.1.3 Material of construction

The material for different components parts of valve shall conform to requirements as given below:

Sl. No.	Component	Material Composition
1	Body, Disc, Thrust plate	Ductile Iron (EN-JS-1030 GGG-50 /SG Iron IS-1865 (Grade 500/7) / SG Iron IS-1865 (Grade 400/10)
2	Shaft	Stainless Steel AISI-410 / EN1.4021

Sl. No.	Component	Material Composition
3	Body Seat Integral	Micro finished Chromium Steel plated / Nickel weld overlay
4	Shaft Bearing Bushes	Phosphor Bronze
5	Disc seal, O Ring	EPDM rubber
6	Internal Fasteners	Stainless Steel AISI 304

3.1.4 Gearboxes for Butterfly ValvesGearboxes shall be of the self-locking type, with a continuous indicator. Traveling nut and screw type of gearboxes shall not be acceptable.

Each gearbox must conform to the provisions of AWWA C504. The rated torque capability of each operator shall be sufficient to seat, unseat and rigidly hold in any intermediate position the valve disc it controls under the operating conditions specified. Operating torque must be as per requirements given in AWWA C504.

The operator shall be of worm and worm wheel design, self-locking type with or without an additional spur gear arrangement to ensure that the effort on the hand wheel is limited to the pull specified.

All valve operators shall be equipped with adjustable mechanical stop-limiting devices to prevent over-travel of the valve disc in the open and closed positions. Either end of the worm shaft must be provided with a needle roller bearing to take the lateral thrust.

The housing for the gearing must be enclosed and sealed in such a way that there is no leakage of oil / grease even after long period of idleness and there shall be no ingress of rainwater. Operator for valves, which are likely to be submerged in water for any period of time, shall be watertight.

Valves for exposed service or in vaults shall be equipped with a hand wheel. The hand wheel may be provided with an extension for easy grip. The hand wheels must have a provision for locking with a chain and pad lock. All operators when fitted to the valve shaft shall ensure clockwise closing and this shall be indicated on the housing. A mechanical indicator is to be provided to show disc position and end of travel.

3.1.5 CoatingValves shall be coated (inside and outside) with (food grade) epoxy powder of minimum Dry Film Thickness of 250micron.

3.1.6 Marking, Testing and Inspection

The following information shall be cast on each valve body:

- Manufacturers' Name or trade mark
- Nominal pressure of valve
- Size of Valve
- Year of manufacture
- Serial number in punch on top of flanges

Valves shall be tested for Hydro-static test and flaw detection test in accordance with IS: 14846. Inspection shall be carried out at manufacturer's works to test the valves, as per requirement.

The design, construction material, manufacture, inspection, performance and testing shall comply with all applicable Standards and Codes. Nothing in the specification will be construed to relieve the supplier of this responsibility regarding performance of the valves during the contract period.

3.2 Sluice Valves

3.2.1 Scope

This section covers the requirements for Sluice valve shall be as per IS: 14846/ BS: 5150/ DIN: 3352 and their latest revision, compatible for buried applications.

The pressure rating of the valve shall be as per the specific standard followed taking into account the operating pressure. Wherever specifically mentioned, the valve shall be fitted with extended spindle, head stock along with hand wheel for easy operation from the operating platform. There will be no play in the 'XX' and 'YY' axes of the valve gate within the guide channel of the valve. The valves above and including 400 DN shall be provided with spur/ bevel gear arrangement for ease in operation and be fitted with by-pass arrangement. Valves shall have two positions marked at the closed end of the scale. The first position corresponding to the position of the gate tangential to the bore of the seating and the second position below the first, corresponding to the position of the gate as it sits on the seat after moving a further distance equal to the depth of the seating. The gate face rings shall be securely pegged over the full circumference of the valve.

Valves shall be equipped with electrical (motor) actuators, if so specified or shown on the drawings. Valves in buried service or in vaults shall be furnished with extension spindles. Each extension spindle shall be furnished with a universal coupling and intermediate supports.

The following codes are applicable for Sluice valves.

Codes	Description
IS: 14846	Sluice valve for water works purposes
IS: 2906	Specifications for sluice valves for water works purposes

3.2.2 Nominal Pressure and Dimensions

The dimension and mass of the sluice valves shall be in accordance with IS: 14846. The flanges and their dimensions of drilling shall be in accordance with IS: 1538 (part-I to XXII).

3.2.3 Material of Construction

The material for different components parts of sluice valve shall conform to requirements as given below:

Sl. No.	Component	Material
1.	Body, bonnet, stuffing box, gland etc	Ductile Iron GGG 40 (EN-JS- 1030) / Spheroidal Graphite iron IS:1865 Gr.- 400/12
2.	Wedge	Ductile Iron GGG 40 (EN-JS- 1030) / Spheroidal Graphite iron IS:1865 Gr.- 400/12 to be encapsulated with EPDM rubber
3.	Spindle / Stem	Stainless steel, IS: 6603; AISI 410, AISI 420
4.	Stem nut	High Tensile Brass
5.	Bonnet Gasket	EPDM rubber (Approved for drinking water)
6.	Internal fasteners, Bolts, Nuts	Stainless steel SS316/304 or better

The valves should be with replaceable stem nut and replaceable sliding shoes. Valve stems shall be of single piece thread rolled. Valve shall have 3 "O" rings of NBR for stem sealing.

3.2.4 Coating

Valves shall be coated (inside and outside) with (food grade) epoxy powder of minimum Dry Film Thickness of 250micron.

3.2.5 Marking, Testing and Inspection

The following information shall be cast on each valve body:

- Manufacturers' Name or trade mark
- Nominal pressure of valve (PN 1.0 or 1.6)
- Size of Valve
- Year of manufacture
- Serial number in punch on top of flanges

Valves shall be tested for Seat leakage test, Body hydrostatic test, Valve operation and flaw detection test in accordance with IS: 14846. Inspection shall be carried out at manufacturer's works to test the valves, as per requirement.

The design, construction material, manufacture, inspection, performance and testing shall comply with all applicable Standards and Codes.

3.2.6 Installation of Valves

Valves shall be installed between flanges according to the instructions of the manufacturer and the Engineer in Charge. Valves shall be placed on a support of concrete so that no shear stress is in the flanges. In case of axial thrust due to closure of a valve against pressure the valve shall be anchored in the support in a suitable manner to transfer the thrust into the floor slab of the chamber.

3.3 Air Valves

3.3.1 Scope

This section relates to the providing and installation of Ductile iron Double Ball Kinetic Air Valve (as per IS: 14845) in pipeline segments. The air valves shall be single chamber, double orifice DI Air Valve with venting, admitting and venting during operation, tamper proof in one piece construction. All air valves shall have an isolating sluice valve (as per IS: 14846) so arranged that they can be closed from the ground surface above, with a tee key even when the air valve chamber is flooded.

3.3.2 General

Air valves shall release accumulated air under pressure, when such mains are charged with water and admit or ventilate air as necessary, when the mains are being emptied of water. Unless specified otherwise, Air relief Valves shall be conventional double ball Kinetic air valves, allowing for high rates of air ingress as well discharge.

The dimensional requirements for Double ball Kinetic air valves shall confirm to IS 14845. The design shall be such that higher the rate of flow the greater the resultant down thrust keeping the ball 'glued' to its seat until the last drop of air is expelled from the pipe system.

The valves shall have an integrated sluice valve. The valves shall have flanged ends machined and drilled according to IS 1538 (Part IV and VI) and IS 6418. The possible air velocity (inflow and outflow) must be at least 10 m/s.

All branched outlets including air valve tees shall be provided with one ½" BSP tapped coupling duly plugged for measurement of pressure. The closing plug shall be in Stainless Steel (AISI 304 or equivalent) with a hexagonal head. The head shall be provided with a copper washer for sealing.

3.3.3 Material of Construction

The material for different components parts of the air valve shall conform to following requirements:

Sl. No.	Component	Material Composition
1	Body, Cover, Bonnet	Ductile Iron, EN-JS 1030 (GGG-40)
2	Float	Stainless Steel AISI 316 Ti/ ASTM A 240 Gr-316 Ti
3	Shell body	Stainless steel (ASTM A240 Grade 321/AISI 321)
4	Shut off device and ring	Stainless steel (ASTM A240 Grade 321/AISI 321)
5	Gasket and seal	EPDM rubber approved for drinking water
6	Isolating sluice valve	Ductile Iron as per specifications laid herein

3.3.4 Coating

Valves shall be coated (inside and outside) with (food grade) epoxy powder of minimum Dry Film Thickness of 250micron.

3.3.5 Marking, Testing and Inspection

Each valve body shall be permanently marked with the following information:

- Nominal Size
- Nominal pressure rating
- Type of Valve
- Manufacturers name or Trade mark
- Sl. Number and year of manufacture.

Valves shall be tested for Hydro-static test to check the function of the floats and High pressure and Low pressure Orifice seat test and body test as per Clause 12 of IS: 14845. The body and seat of the valve shall withstand the test pressure (1.5 times the working pressure) as specified for the particular working class. Testing of Valves shall be in accordance with IS: 14845. The air valve should be able to seal at as low as 0.3 bar, which should be demonstrated at test bed. Inspection shall be carried out at manufacturer's works to test the valves, as per requirement.

The design, construction material, manufacture, inspection, performance and testing shall comply with all applicable Standards and Codes.

3.4 Dismantling joints

3.4.1 Scope

The scope of this section includes supply, fixing, and testing of dismantling joints of 3 flange type to be fixed on large diameter mains / valves / flow-meters and similar pipeline appurtenances (of 300mm and above) for operational and functional reasons. The dismantling joint shall provide flanged end pipe interfaces with valves, meters or other specials and allow for dismantling of the joint without dismantling of the connecting pipe / pipeline appurtenances.

Dismantling joints shall be a double-ended flanged adapter that allows for longitudinal adjustment in piping systems where flanged end pipe is utilized.

3.4.2 Technical Requirements

Double flanged Dismantling joints shall be fabricated from MS plate in such a manner that valves can be dismantled without stress to the joints. These shall be for working pressures of up to 16 kg/cm2 and shall be completely leak proof with proper seal arrangement. Flange dimensions of the joints shall conform to IS: 1538.

Flanged specials shall be supplied with required nuts, bolts, and rubber gaskets. The nuts and bolts shall be of

best quality carbon steel, machined on the shank, and electro-galvanized. Rubber gasket shall be as per IS: 5382. Dimensions and drilling of flat gasket will be as per IS: 1538, suitable for making flanged joint. The dismantling pieces shall provide minimum clearance of + 25 mm (total distance 50 mm).

The dismantling joints shall be encased in appropriately sized polyethylene sleeves, meeting ANSI/AWWA C105/A21.5, for direct buried applications. Manufacturer's certification of compliance to the above standards and requirements shall be readily available upon request.

Each dismantling joint shall be pressure tested prior to shipment against its own restraint to a minimum of 20 kg/cm2 for joints up to 700 mm in diameter and to 15 kg/cm2 for joints 750 mm and greater in diameter. A minimum 2:1 safety factor, as determined from the published pressure rating, shall apply.

3.4.3 Coating

All internal surfaces (wetted parts) shall be lined with a minimum of 400 microns of fusion bonded epoxy (FBE) conforming to the applicable requirements of ANSI/AWWA C213. Sealing gaskets shall be constructed of EPDM. Exterior surfaces shall be coated with a minimum of 150 microns of FBE conforming to the applicable requirements of ANSI/AWWA C116/A21.16.

3.5 Valve Actuators

3.5.1 Codes and Standards

This specification covers the general requirements of electric motor Actuators for valves. All electrical equipment shall conform to the latest applicable IS, ANSI and NEMA Standards except when stated otherwise herein or in the valve specification subsection.

3.5.2 Design Requirements

The actuator shall be suitable for operation in a hot, humid, dusty and tropical atmosphere. The type of actuator offered shall have been in satisfactory operation under similar conditions. For isolating service, the actuator shall be rated for three successive open-close operations of the valve or 15 minutes, whichever is longer. For regulating service, the actuator shall be suitably time rated for the duty cycle involved with the necessary number of starts per hour.

The actuator shall open and close the valve completely and make leak tight valve closure without jamming. The actuator shall attain full speed operation before valve load is encountered and impact an unseating blow to start the valve in motion (hammer blow effect) to open it. The actuator shall operate the valve stem at standard stem speed and shall function against design differential pressure across the valve seat.

The actuator motor reduction gearing shall be sufficient to lock the shaft when the motor is de-energized and prevent drift from torque switch spring pressure. The entire mechanism shall withstand the shock resulting from closing the valve with improper setting of limit switches or from the lodging of foreign matter under the valve seat.

3.5.3 Features of Construction

3.5.4 General

Each actuator shall be comprised of an integral starter, drive motor, torque/limit switches, gear train, clutch, hand wheel for manual operation, position indicator/transmitter, space heater, thermal overload protector and internal wiring. The actuator enclosure shall be dust tight and weather-proof, suitable for installation outdoors without requiring a canopy. The weather protection class of the actuators shall have an Ingress Protection Rating (IP) 65 for indoor and IP 68 for outdoor installations.

Each actuator shall be adequately sized to suit the application and be continuously rated to suit the modulating control required. The gearbox shall be grease filled, and capable of installation in any position. All operating spindles, gears and head stocks shall be provided with adequate points for lubrication.

The valve actuator shall be capable of producing not less than 1½ times the required valve torque and shall be suitable for at least 15 minutes continuous operation.

Each actuator shall be provided with a hand wheel for emergency manual operation. The hand wheel shall de-clutch automatically when the motor is energized, but shall be capable of being engaged at other times by positioning the clutch lever. The electric operation shall override the manual operation.

Each actuator shall have:

a) 1-Built-in local position indicator for 0% to 100% travel.

b) 2-potentiometer type position transmitters, of 100 ohm rating each for remote indication.

c) A visible local valve position indicator mounted on the operator assembly itself.

The internal wiring shall be of sufficient size for the power rating involved but in no case less than 1.5 mm^2 copper. All wiring shall be identified at both ends with ferrules. The terminal box shall be suitable for outdoor use and shall be weatherproof and dust proof.

All electrical equipment accessories and wiring shall be provided with tropical finish to prevent fungus growth. The actuator shall be designed for mounting in any position without any lubricant leakage or operating difficulty

The actuator shall be painted with epoxy paint. The color shall be approved by the Employer's Representative.

A nameplate shall be provided on each actuator as per the relevant IS standard. In addition, the following shall also be included on the nameplate:

- Tag number
- Torque rating
- Full travel time

Local controls shall be protected by a lockable cover.

3.5.5 Torque / Limit Switches

The torque switch shall function to stop the motor on closing or opening of the valve, or upon actuation by high torque when the valve disc is restricted in its attempt to open or close. A minimum of 2 torque switches, one for closing direction and one for opening direction shall be provided.

The torque switch shall have a minimum accuracy of 3% of set value. The torque switch shall be provided with calibration knobs for setting desired torque and separate knobs shall be provided for the open and closed torque switches.

Non-adjustable limit switches shall stop the motor and give indication when the disc has attained the fully open or close position. Each limit switch shall have 1 NO and 1 NC potential free contacts. The rating of the contacts shall be 5 A at 240 VAC.

Each actuator shall be provided with the following limit switches:

a. 2 self-locking and adjustable torque limit switches, one for each direction of travel.

b. 4 end-of-travel limit switches, two for each direction of travel.

c. 2 position limit switches, one for each direction of travel, each adjustable at any position from fully open to fully closed positions of the valve.

The torque and limit switches shall be housed in a separate enclosure with the same protection class as that of the actuators.

3.5.6 Relays

Each actuator shall be provided with 2 DC interposing relays for matching the low voltage of remote commands with the control voltage for remote operation. The contact rating shall be 5 A, 240 VAC.

The available signal shall be comprised of the following:

a. Actuator mounted Local-Off-Remote. Selector switch set to Remote.

b. No power failure at starter.

c. Emergency stop not operated.

d. No drive fault.

3.5.7 Terminal Boxes

All wiring connections from the various switches shall be brought to a separate terminal box mounted on the valve. All torque switches, space heaters and position transmitters, shall be wired and terminated in a terminal box having liberal space for wiring and making connections. There shall be at least 5 spare terminals to terminate spare cores of cable.

The terminal box shall be weather-proof with a removable front cover and cable glands for cable connections. The terminal shall be suitable for connection of 2.5 mm2 copper conductor. The terminals, terminal boards, terminal boxes, winding tails and associated equipment shall be suitable for connection to a supply system having 'adequate short-circuit capacity and clearance time determined by associated fuses'. The terminal boxes shall be totally enclosed.

3.5.8 Starters

The actuator starters shall be integrally housed with the actuator in robustly constructed and totally enclosed weatherproof housings. The motor starter shall be capable of starting the motor under the most severe conditions.

The starter housing shall be fitted with contacts and terminals for power supply, remote control and remote positional indication, and shall also be fitted with internal heaters so as to provide protection against damage due to condensation. Heaters shall be suitable for single phase operation. The heaters shall be switched "ON" when the starters are "OFF" and shall be switched "OFF" when the starters are "ON".

3.5.9 Motors

The motor shall be specially designed for valve operation, combining low inertia with a high torque and with linear valve characteristics.

The actuator motor shall be three phase, totally enclosed fan cooled (TEFC), induction motor with class B insulation and IP 68 protection, designed for high torque and reversing service. The motor shall be designed for full voltage direct on-line start with starting current limited to 6 times the full-load current.

The motors shall be capable of starting at 85 percent of rated voltage and running at 80 percent of rated voltage at rated torque and 85 percent rated voltage at 33 percent excess rated torque for a period of 5 minutes each. Earthing terminals shall be provided on either side of the motor.

3.5.10 Reversing Starters

The reversing starters shall be equipped with forward and reverse contactors, electrically interlocked with each other.

The terminal overload relays provided with the reversing starters shall have 3 elements, positive acting, ambient temperature compensated, time lagged thermal overload relays with adjustable settings. The setting range shall be properly selected in accordance with the rating of the motor. Thermal overload relays shall be hardest type. The 'STOP' push button of the starter and the hand-reset device shall be separate from each other.

An Overload relay reset push button shall be brought out to the front and made easily accessible. An Overload relay shall be provided with at least 1 'NO' and 1 'NC' or 1 change-over contact. The minimum continuous current rating of the Contractors shall be 16 A for all actuator valve motors up to 6 kW.

3.6 Flow measuring System

3.6.1 General Requirements

Flow measuring system shall consist of flow sensor, flow transmitter, digital flow indicator and integrator and any other items required to complete the flow measuring system in totality. Flow sensor shall be rugged in construction and shall be suitable for continuous operation. Flow sensor shall have waterproof construction and shall be suitable for installation on underground / partially buried / above ground pipelines.

To avoid the effects of disturbances in the velocity profile, a straight and uninterrupted run, upstream as well as downstream from the location of the flow sensor shall be provided, as required by the flow meter manufacturer and in line with applicable standards. Contractor shall finalize the exact location of flow transducers in consultation with Engineer-in-charge.

The flow transmitter shall be suitable for remote mounting (at the reservoir locations) and shall accept input from the flow transducer. It shall process the input signal and provide 4 - 20 mA DC output proportional to flow rate. Flow transmitters shall have LCD display to indicate instantaneous flow rate. The flow range shall be adjustable. The flow meters shall be suitable for measuring flow at velocities of water from 0 to 6 m/sec. The flow computer shall be microprocessor based and shall have self-diagnosis facilities.

3.6.2 Scope

The scope shall include supply of all flow-meters with all related fittings, fixtures at site including counter flanges as required for the flow meters, including installation. The scope shall also include supply of hardware's and software's required for the data logging/monitoring system.

Unless, specified otherwise, all flow-meters shall be full bore Electro-magnetic flow-meters.

3.6.3 Design Requirements

The design/ selection criteria to be applied for flow and pressure measuring/ transmitting instruments shall be as follows:

(a) All instruments shall be suitable for continuous operation

(b) All transmitting instruments shall have a 4 - 20 mA linear output

(c) All digital outputs shall be potential free

(d) All instruments shall be designed for the ambient conditions of temperature and humidity

(e) All wetted parts of instruments sensors shall be non-corrosive and suitable for use with potable water containing residual chlorine

(f) All instrumentation systems for outdoor application shall be protected to IP 68

(g) All analogue displays shall be of the digital type with no moving parts

(h) Instrumentation shall utilize solid state electronic microprocessor technology and avoid the use where practical of any moving parts

(i) Instruments shall resume operation automatically on application of power following a power failure

3.6.4 Electromagnetic Full Bore Type Flow meters

3.6.5 Scope

The scope covers supply and installations of Electromagnetic flow measuring system including all necessary

fittings, specials and other related equipment to complete the installation successfully in Cast Iron, Ductile Iron, Mild Steel and or PE pipes.

Flow-meters Meters shall be installed on the outlet mains from service reservoirs and shall be logged during district flow measurements. These meters are expected to set out the remote reading facility of flow and pressure data from field to control room via GSM / GPRS.

All electromagnetic flow meters shall be installed on the pipe mains. It is recommended to use available direct electrical power supply from the grid wherever possible and to use battery powered meters transmitters if otherwise. However the direct power supplied transmitter shall have inbuilt battery or provided with backup power battery for continuous operation during power failure.

The full bore electromagnetic flow meter shall consist of flow sensor (i.e. flow tube) equal to the diameter of the pipeline and derived / confirmed from the flow-rate and shall be provided with remote mounted flow transmitter and flow indicator and integrator and any other item required for completing the flow measuring system. Flow measurement shall not be affected by physical properties of water viz., temperature, pressure etc., within given limits. The flow meter shall be suitable for by directional flow.

3.6.6 General Requirements

Meter should be certified to OIML R49 to Class 1 and Class 2 accuracy or internationally recognized equivalent. Electro-magnetic flow-meters shall be full-bore and suitable for reporting bi-directional flow.

- Sensors to be buried type and fully submersible (IP 68) and Sensors should be flanged comprising sealed flow stainless steel electrodes.
- Sensors should be available with reduced bore option to maintain low flow accuracy.
- Provide sufficient length Integral armoured tamper-proof sensor cable (IP68) from sensor to transmitter (typically with 10 m cable length however longer may be required at some sites).
- Suitable for HDPE, Steel, Cast Iron and Ductile Iron.

The requirements for Flow sensor shall confirm to the following standards or better.

Parameter / Component	Standard / Requirement
Size	To be derived as per flow-rate and pipe size
Type	Pulse DC excitation
Flange Rating	ANSI 150 /DIN PN Std
Electrode	SS 316
Meter Tube	SS 316
Protection category	IP 68
Connection / Junction Box	SS 316
Earthing	Grounding Rings in SS304
Accuracy	±0.5 % of MV
Marking	Flow direction with arrow, size Serial No. & Make

The flow computer and transmitter shall be a single unit suitable for remote mounting. It shall accept inputs from flow-tube process the signals and shall provide an output proportional to the flow rate. The output shall be suitable for transmitting over a long distance.

- Provide tamper proof detachable transmitter enables to indicate flow & net total flow recording display and other necessary indicators. Transmitter display parameter should be: flow rate in (m3/h or m3/s); net flow (volume) in (m3).

- Transmitter units should be fully interchangeable and 'plug and play' and provide flow pulse outputs to external data logger.
- Transmitter heads should be factory sealed and potted (IP68).
- All external connections to the transmitter should be 'military specification' (IP68) plug and socket.
- Transmitter shall have inbuilt battery power for minimum of 5 years continuous period. To satisfy the condition if supplier requires additional power an external battery shall be provided. Provision should be given in the transmitter to indicate low battery condition to the control room.

3.6.7 Calibration

The electromagnetic flow sensor shall be wet calibrated and the calibration information and factory settings matching the sensor shall be stored in an integral mounted memory unit. Such memory unit shall store the sensor calibration data and signal converter settings for the life time of the product. The calibration standard shall confirm to ISO 17025.

3.6.8 Digital Panel Meters

Digital panel meters (DPM) shall be microprocessor based and modular in design. They shall accept 4 - 20 mA DC signals from transmitters. The DPM's shall provide an output of 4 - 20 mA DC proportional to input signal for re-transmitting. The DPM'S shall have back-lit LCD/ LED display. Digital panel meters shall provide excitation voltage to the respective transmitters.

3.6.9 Ultrasonic Insertion Probe Type Flow-meters

3.6.10 Scope

Ultrasonic Insertion Probe Type Flow Water Meters shall be installed in the water supply system (preferably large diameter mains) where installation of electromagnetic meters is un-economical. Direct insertion type preferred Flow-meter preferred.

It is recommended to use available direct electrical power supply from the grid wherever possible and to use battery powered meters transmitters otherwise. However the direct power supplied transmitter shall have inbuilt battery or provided with backup power battery for continuous operation in the event of power failure.

3.6.11 General Requirements

Sensors

Sensors shall be capable of reporting bi-directional flow, with bi-directional velocity measurement up to 20 m/s. The flow-meter shall be suitable for pipe line sizes from 600 mm to 1000 mm. The sensor shall have:

- Dynamic amplification of 80 dB to sample weakest signals. Hence flow measurement, possible in critical conditions.
- Automatic computation of Reynolds number & Hydraulic coefficient.

Transmitter

The transmitter should provide tamper proof detachable transmitter enabling to indicate flow & net total flow recording display and other necessary indicators. Transmitter display parameter should be: flow rate in (m3/h or m3/s); net flow (volume) in (m3). The transmitter should:

- Provide protection from Lightning & surge.
- Transmitter units should be fully interchangeable and "plug and play".
- Provide flow pulse outputs to external data logger.

- Have required battery back-up to transmit data to external data logger.
- External connections to the transmitter should be security protected by user defined password.
- Suitable for Steel, Cast Iron and Ductile Iron.

Sensors via transmitter should provide pulsed output to external data logger for remote transmission of data. The flow-meter shall have sufficient length of standard armoured tamper-proof sensor cable (IP68) inside conduit from both sensors to transmitter (Typically with 10 m cable length however longer may be required at some sites). Plastic cable glands are not acceptable. Transmitter will be installed inside the roadside outdoor enclosure.

3.7 Supply and Installation of Domestic Water meters

3.7.1 Scope of the work

The scope of the work is for supply of domestic water meters (of 15mm, 20mm, 25mm, 40mm) pre-equipped with AMR system with all necessary accessories and 5years guarantee as per requirement including installation to (new or existing) water supply service connections..

Domestic water meters (number and sizes) shall be supplied in a phased manner and shall be done in consultation with the Engineer.

3.7.2 General Requirements and Applicable standards

Domestic water meter shall be inferential, super dry multi-jet meters magnetically coupled, having dry dial, Class 'B' or equivalent conforming to IS-779 with up to date amendments or ISO 4064 standard with up to date amendments with ISI/EEC/OIML/MID certification mark shall be with protection class of IP-68. The meters shall be supplied complete with GI fittings, brass nuts and brass nipples, including strainer & sealing along with non-return valve.

The meters should also have valid EEC certification and confirm to ISO 9001 and possess ISO 14001 certificate.

3.7.3 Specifications of Water meters

Material Specifications

All the materials used to construct/ manufacture customer meters shall confirm to Appendix B of IS:779 or clause 4.7 of ISO 4064-1. In particular the following:

- Body shall be either Bronze or Brass
- The totalizer shield shall be enclosed in a copper can
- Lid shall be made of bronze, brass, plastic or stainless steel
- Cap and cap ring shall be made of Engineered Plastic
- Screws & studs shall be made high tensile brass or superior material
- Strainers shall be made of plastics or superior material
- Impeller shall be made of plastics or superior material
- Impeller shaft shall be of either stainless steel or high tensile brass
- Nipples and nuts shall be of same materials as that of body of the meter
- Measuring chamber shall be of the same materials as that of body of the Meter
- The spindle and bearings inside the hydraulic chamber shall be made of polished stainless-steel with hard metal tip and sapphire.

In case the material specification of the water meters offered is different from the one stated above, the contractor should provide relevant test certificates to prove the superiority of the water meters provided. All meters shall be supplied with nuts and nipples unless specified otherwise.

Totalizer and TotalizerShield

The totalizer shall be of straight reading type, and shall register in cubic meter units. The totalizer shall consist of a row of minimum five on-line consecutive Digits to read at least 99,999 m3. Another three digits or pointers shall

register flows in liters and be of a different color. The totalizer should be of closed type.

The totalizer must be suitable for test on an electronic test bench. It shall be made of copper can having 5mm thickness mineral glass or any other suitable material required to maintain IP 68 protection class.

The totalizer shall be designed in such a way that if the totalizer protective glass is broken for a reason or another the totalizer cannot be removed from its place. The totalizer protective cover shall be made of sturdy glass and shall have a thickness of not less than 5mm and shall pass specified tests. Sturdy glass is defined as the ability of the counter protection glass to withstand, without damage, a free fall of a metal ball weighing 27.2 grams from a vertical distance of not less than 70 cm.

Marking

All water meters shall be marked with the following:

- Class of the meter
- Make / Brand
- Model and Serial number of the meter permanently engraved
- Direction of water flow with an arrow indicating the direction
- ISI or EEC or OIML Code No.
- Working pressure of the meter
- Sl. No.: ; Year of manufacturing

The direction of flow with an arrow is to be provided on body of meter & should be visible when installed irrespective of its position.

3.7.4 Delivery Inspection and Testing

Sampling and Acceptance Criteria

The Contractor shall allow for inspection of all lots of domestic water meters to be supplied prior to their delivery. The Engineer shall reserve the right to select samples at random from each lot. Sampling and criteria for acceptance shall be as per provisions laid down under IS: 779. The Engineer may reduce / relax the number of samples required for testing, in case he feels that the quality of water meters are of acceptable standard / quality.

Type of Tests

All randomly selected water meters shall be tested at ***Fluid Control Research Institute, Palghat***. The following tests are to be carried out:

(i.) Production Routine test (Pressure tightness, Loss of pressure, Metering accuracy, Minimum starting flow) shall be as per the provisions of clause 12.3 of IS 779.
(ii.) Accelerated Endurance Test shall be conducted as per IS: 6784. Report on the meters which have undergone accelerated endurance test shall be subjected to further routine tests, details of which shall be furnished.

Costs for packaging, conveyance and testing shall be borne by the Contractor and shall be included in his quoted rates. The Contractor shall provide the manufacturer's Production Routine Test Certificates for each lot meters.

Each meter should be supplied in separate individual box with its accessories and test certificates and guarantee card for free repair/ replacement for duration of 5 years.

3.7.5 Guarantee Period

All Water Meters shall have a minimum guarantee period of 60 months. All meters which are found to be defective during the guarantee period shall have to be replaced.

3.7.6 Installation of water meters

The new meters are to be fixed on the service connections near the entrance of property of consumer or at the location earmarked in the dwelling unit. The consumer record including name, address, property details, Contact number (Landline / Mobile number, E-mail id) and type of connection (domestic, commercial, industrial etc) shall be recorded.

The contractor should note that existing service connections are of GI. Any leakage observed in joints of special & pipe fixed by the contractor while installing the water meters during the contract period shall be repaired by the contractor at his own cost.

The contractor shall suggest the preventive measures required to be taken by the consumers to avoid damage to the installed new meters.

3.7.7 Measurement and Rate

Water meters shall be enumerated in numbers. The rate shall include cost for supply, installation with all necessary fittings, fixtures etc all complete including preventive maintenance and meter recording during the contract period.

3.8 Providing House Service Connection

3.8.1 Scope of work

The bidder will ensure proper House service connection with MDPE pipe (15/20/25/40 mm) from the distribution main to the property of the owner. Provision for House service should be of tapping DI distribution pipe with clamp saddle, ISI marked brass ferrule, followed by MDPE pipe as per IS with compression fittings. There may be mix and match of MDPE house service connection with the use of GI pipes wherever required but essentially with compression joint instead of GI socketed joint and elbows which are bigger source of contamination.

The scope includes

The work shall consist of cutting a trench and refilling, Restoration of cut surfaces (complete work), providing and fixing clamp saddle, brass ferrule including boring and tapping the main, providing and fixing PE-AL-PE pipes (conforming to relvent IS and specifications) with specials as per the specifications and drawing with all lead & lift and as directed by the Engineer.

3.8.2 Service Connection Pipes

3.8.3 PE-AL-PE pipes Fittings (conforming to relvent IS and specifications) with

Technical Specifications for House Service Connection Materials

A. COMPRESSION FITTINGS:
Compression fittings used for House service connection comply as per ISO 14236

Material of Construction:

Compression fittings material shall confirm to ISO14236.Clause -5.
a. Body-Polypropylene
b. Nut / Cap –Polypropylene.
c. Clip Ring-POM (Acetylic resin)
d. Packing bush- Polypropylene
e. “O” ring – NBR
f. Threaded metal inserts –SS 304 with BSP Threads

Pressure testing:
The pressure rating of compression fittings as per clause 8 of ISO 14236 which shall be PN16

Dimensions:

The Dimension of compression fittings shall be as per clause 7.1 of ISO 14236

Performance requirements:
The compression fittings shall be tested as per ISO 14236. Following Test methods shall be

performed.
Clause 8.2.1 -Leak tightness under internal pressure.
Clause 8.2.2 -Resistance to Pull out.
Clause 8.2.3 -Leak tightness under Internal Vaccum.
Clause 8.2.4 -Long term Pressure Test for Leak tightness for assembled joint
Clause 8.3.2.1 -MRS Value as per ISO 9080
Clause 8.3.3.1 -Resistance to Internal pressure.
Effects on Quality of Water:

The Compression fittings for intended for conveyance of Potable water for Human consumption to be tested to comply with BS 6920 specifications in any of the Govt. approved laboratories and certificate of compliance to be produced for the following parameters:

a. Odour & Flavour of Water.
b. Appearance of Water.
c. Growth of Micro Organism
d. Extraction of substances that may be of concern to Public Health (Cyto Toxicity)
e. Extraction of Metals.
For clear identification of the water services, the nuts of the fittings should be coloured blue while the body to be black. All fittings with threaded ends should be with BSP threads.

B. U PVC BALL VALVES (STOP COCKS):

Ball Valves used for HOUSE Service Connections comply to ISO 4422, Part 4.

Material of Construction:

Ball Valve material shall confirm to as per clause 4 of ISO 4422.
a. Body and Handle - UPVC
b. Seals - PTFE
c. O-rings – NBR/EPDM
d. Material of Construction for compression end will as per specifications for compression fittings.

Pressure Rating:

The Pressure of the Ball Valve shall be as per ISO 4422 shall be PN 16.
Dimensions:
The Dimensions of the Ball Valve shall be as per Table 3 of ISO 4422.

Performance Requirements:

The Ball valves shall be tested as per ISO 4422.Folowing test methods will be performed.
Clause 7.1 - Resistance of Valve Bodies to internal pressure
Clause 7.2 - Crushing Test
Clause 7.3 - Endurance Test
Clause 7.4.2 - Seat and Packing Test
Clause 7.4.1 - Operating torque Test

The Ball Valves intended for conveyance of Potable water for Human consumption to be tested to comply with BS 6920 specifications in any of the Govt. approved laboratories and certificate of compliance to be produced for the

following parameters:

a. Odour & Flavour of Water.

b. Appearance of Water.

c. Growth of Micro Organism

d. Extraction of substances that may be of concern to Public Health (Cyto Toxicity)

e. Extraction of Metals.

C. Specifications for Strap-Clamp Saddle for Service Connections on DI Pipes.

General Specifications:

Clamp saddles for service connection from water distribution mains shall be of wrap around
design, wide skirt and wide straps support, which shall reinforce the pipe while providing Excellent stability to the saddle. Clamp Saddles for service connections shall be of fastened strap type with threaded outlet for service connection.

The service connection threading sizes shall be conforming to IS: 554
Clamp saddles shall be suitable for DI pipes of nominal size 3" (NB 80) to 12" (NB 300) with nominal service connection size from ½" (NB 15), ¾" (NB 20), 1" (NB 25), 1 ¼" (NB 32), 1 ½"(NB 40) and 2"(NB 50).

The wrap around straps shall be plastic type for firm grip on pipe as well as to protect the coating on the pipe. The strap design shall be such that metallic part of the saddle, if any, shall not come in direct contact with pipe and must insulate the un-identical metals. The saddles shall be single strap type upto pipe sizes of NB 600 and service outlet of ½", ¾" and 1".

The saddles shall be double strap type for pipe sizes above NB 600 or when the service outlet is 1 ¼", 1 ½" or 2". Fasteners shall be threaded type. Fasteners of size ½" (M12) shall be used for saddles of size up to 4" (NB 100) and Fasteners of size 5/8" (M16) shall be used for saddles of size 6" (NB 150) and above. 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 applications.
The Material of construction of the body, fasteners etc. shall be of a non-corrosive material
such as engineering plastic (PE/PP) or stainless steel or a combination of both. The design of the saddle body should be such that, the service connection outlet metal insert shall project out towards pipe side and align with the hole drilled on the pipe to ensure positive locking against rocking or creeping on the pipe, as might be caused by vibration, pressure or excessive external loading.
The clamp saddles shall be suitable for maximum working pressures upto 10 bars. Material and Design Specifications:
Saddle Body:The saddle body shall be of DI

Saddle Seal: It shall be virgin rubber SBR Grade 30 / NBR (NSF 61 approved). It shall be of
type pressure activated hydro-mechanical design. It shall be contoured gasket to provide a positive initial seal which increases with increase in the line pressure. Gasket shall be gridded mat, with tapered ends, with the outlet section having o-ring contacting the saddle body multiple o-rings contacting the pipe, preferably with a Stainless steel reinforcing ring insert moulded to prevent
expansion under pressure.

Fasteners: Stainless Steel Type 202, NC rolled thread, Tightening torque for ½" (M12) Fastener: 14-15 kg.m and for 5/8" (M 16) Fastener: 21-23 kg.m

Disinfection of pipelines:

The pipeline shall be disinfected before commissioning as per Clause 15.9.25 of Volume-III

'Standard Specifications for Civil Works'.

Carting and Handling

Pipes and fittings/specials shall be transported from the factory to the work sites at places alongthe alignment of pipeline as approved by Engineer in lengths not more than the length of thetransporting vehicle. Contractor shall be responsible for the safety of pipes and fittings/specials intransit, loading/unloading. Every care shall be exercised in handling pipes and fittings/specials toavoid damage. While unloading, the pipes and fittings/specials shall not be thrown down from thetruck on to hard surfaces. They should be unloaded on timber skids with steadying ropes and / orby any other approved means. Padding shall be provided between coated pipes, fittings/specialsand timber skids to avoid damage to the coating. Suitable gaps between pipes should be left atintervals in order to permit access from one side to the other. As far as possible pipes shall beunloaded on one side of the trench only. The pipes shall be checked for any visible damage (suchas broken edges, cracking or spalling of pipe) while unloading and shall be sorted out forreplacement. Any pipe, which shows damage in the opinion of Engineer, shall be discarded andreplaced by new one without extra cost. Dragging of pipes and fitting/specials along road orpipeline alignment shall be prohibited.

Measurement of pipes and specials

The length of pipe (DI / PE-AL-PE) shall be measured in running meter correct to a centimetre for thefinished work measured along the centre line of pipe including of specials.

Commissioning

After satisfactory testing of the pipelines, pipelines have to be disinfected by using bleachingpowder and flushing with clean water and shall be commissioned for operation and shall becertified by the Engineer.

Ferrules

The brass ferrules for connection with DI Pipe mains shall generally conform to IS: 2692. It shall beof non-ferrous materials with a gunmetal bell mouth cover.

Service pipes of less than 50 mm bore may be connected to mains by means of right-angledscrew-down ferrule. The main is drilled and tapped and the ferrule screwed in. In case of largesizedtrunk mains, this may be done by a tapping under pressure machine, which will obviate anyinterference with the use of the main.

3.8.4 Ferrules

Brass Ferrules for connection with DI pipes shall generally conform to IS: 2692. Ferrule shall be fitted with a screw and plug or valve capable of completely shutting off the water supply to the communication pipe, if and when required. Ferrules shall be tested as per relevant IS specifications. The size of ferrule should not exceed a quarter of the nominal diameter of the main and also be less than the size of the service pipe/connection pipe.

3.8.5 Measurement and rate

MDPE Service connection pipes as laid shall be measured correct to a cm, including all fittings and fixtures (Union, Elbows, bends etc).

Chapter 4 Specifications for General Civil Works

4.1 General

The Technical requirement for Civil Works outlines the details of materials, equipment, workmanship, and quality control guidelines for the major items contained in the Bill of Quantities (BOQ) for the works. The "Central Public Works Department" (CPWD) Specifications: issued by CPWD shall also be referred to along with this General Civil Works, wherever appropriate.

The specifications and Bill of Quantities (BOQ) shall be read in conjunction with the other Contract Documents. All the documents and drawings are to be regarded as mutually explanatory. In the event of any discrepancy or assumed discrepancy being found between them, the Contractor shall immediately inform the Engineer-in-charge of the matter in writing and the Engineer will issue his instructions in the matter in accordance with the Conditions of Contract.

In general other than CPWD Specifications, provisions of the Indian Standard Codes, Indian Roads Congress Codes, and MoRTH Specifications for Roads and Bridge Works, and other national standards have been followed. These Specifications are not intended to cover the minute details. The work shall be executed in accordance with best modern practices. All codes and standards referred to in these Specifications shall be the latest revision thereof.

4.2 Materials for Civil Structures

Materials to be used in the work shall conform to the Specifications mentioned in the document, the requirements laid down in this section and Specifications for relevant items of work covered under the Specifications.

If any material, not covered in these specifications, is required to be used in the work, it shall conform to relevant Indian Standards or International Standards (in the absence of Indian standards) or to the requirements specified by the Engineer.

4.2.1 Sources of Materials

The Contractor shall notify the Engineer of his proposed sources of materials prior to delivery. If it is found after trial that sources of supply previously approved do not produce uniform and satisfactory products, or if the product from any other source proves unacceptable at any time, the Contractor shall furnish acceptable material from other sources at his own expense.

4.2.2 Bricks

Burnt clay bricks shall be hand or machine moulded conform to the requirement of IS: 1077, except that the minimum compressive strength when tested flat shall not be less than 75 kg/cm2 for average of 5 specimens and individual brick strength not less than 70 Kg/cm2. They shall be free from cracks and flaws and nodules of free lime. Frog shall be 1 to 2 cm in depth. The brick shall have smooth rectangular faces with sharp corners and emit a clear ringing sound when struck. The tolerance of ± 8% shall be permitted over the average size of the bricks specified by the Engineer for the work. The bricks shall not absorb more than 20% of water by weight when immersed in water for 24 hours.

Mandatory tests as required shall be done. All Bricks brought to site, shall be stacked and shall be got checked through visual inspection and subsequent testing in the laboratory by the Engineer before commencement of work.

4.2.3 Cement

Cement to be used in the works shall be any of the following types with the prior approval of the Engineer. These shall have to be procured from reputed ISO: 9000/ 14000 organizations:

1. Rapid Hardening Portland Cement, conforming to IS: 8041
2. Ordinary Portland Cement (OPC), 53 Grade, conforming to IS: 12269
3. Portland Slag Cement (PSC), 53 Grade, conforming to IS: 455
4. Portland Pozzolana Cement (PPC), 53 Grade, conforming IS: 1489

4.2.4 Coarse Aggregates

For plain and reinforced cement concrete (PCC and RCC) works, coarse aggregate shall consist of clean, hard, strong, dense, non-porous and durable pieces of crushed stone, crushed gravel, natural gravel or a suitable combination thereof or other approved inert material. They shall not consist of disintegrated stones, soft, flaky, elongated particles, salt, alkali, vegetable matter or other deleterious materials in such quantities as to reduce the strength and durability of the concrete, or to attack the steel reinforcement.

Coarse aggregate having positive alkali silica reaction shall not be used. All coarse aggregates shall conform to IS: 383 and tests for conformity shall be carried out as per IS: 2386 Parts I to VIII.

The maximum value for flakiness index for coarse aggregate shall not exceed 35 percent. The coarse aggregate shall satisfy the following requirements of grading:

IS Sieve Size	**Percent 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
4.75 mm	0-5	0-10	0-10

4.2.5 Fine Aggregates

For plain and reinforced cement concrete (PCC and RCC) works, fine aggregate shall consist of clean, hard, strong, and durable pieces of crushed stone, crushed gravel, or a suitable combination of natural sand, crushed stone or gravel. They shall not contain dust, lumps, soft or flaky, materials, mica, or other deleterious materials in such quantities as to reduce the strength and durability of the concrete, or to attack the embedded steel. Motorized sand washing machines should be used to remove impurities from sand. Fine aggregate having positive alkali-silica reaction shall not be used. All fine aggregate shall conform to IS: 383 and test for conformity shall be carried out as per IS: 2386 (Part I to VIII).

The Contractor shall submit to the Engineer the entire information indicated in Appendix A of IS: 383. The fineness modules of fine aggregate shall neither be less than 2.0 nor greater than 3.5. Not more than 10% shall be retained on 4.75 mm IS Sieve. The sum of the percentage of all deleterious materials shall not exceed 5%. It shall not contain harmful organic impurities in such form or quantities as to affect adversely the strength and durability of concrete or mortar. It shall not contain any acidic material, which is likely to attack steel reinforcement.

The fineness modulus of sand to be used in plaster shall be between 1.0 and 1.5. The fineness modulus of sand to be used in concrete and for mortar required for masonry shall be between 2.0 and 3.1. The maximum quantity of silt shall not exceed 8%. Quantity passing through 150 microns IS Sieve shall not be more than 10%. Tests as required under the section 5 "Mandatory Tests" shall be carried out. For masonry work, sand shall conform to the requirements of IS: 2116. Sand/fine aggregate for structural concrete shall conform to the following grading requirements:

IS Sieve Size	**Percent by Weight Passing the Sieve**		
	Zone I	**Zone II**	**Zone III**
10 mm	100	100	100
4.75 mm	90-100	90-100	90-100
2.36 mm	60-95	75-100	85-100
1.18 mm	30-70	55-90	75-100
600 micron	15-34	35-59	60-79

IS Sieve Size	Percent by Weight Passing the Sieve		
	Zone I	Zone II	Zone III
300 micron	5-20	8-10	12-40
150 micron	0-10	0-10	0-10

4.2.6 Water

Water used for mixing mortars and concrete shall be clean and reasonably free from injurious quantities of deleterious materials such as oils, acids, alkalis, salts and vegetable growth. Generally potable water shall be used. Where water can be shown to contain any sugar or an excess of acid, alkali or salt, the Engineer may refuse to permit its use. As a guide, the following concentrations may be taken to represent the maximum permissible limits of deleterious materials in water.

(a) Limits of acidity: - To neutralize 200 ml sample of water, it should not require more than 2 ml of 0.1 N caustic soda solutions.

(b) Limits of Alkalinity: - To neutralize 200 ml sample of water it should not require more than 0.1 ml of 0.1 N hydrochloric acid.

(c) Percentage of solids should not exceed: -

- Organic 200 ppm (0.02%)
- Inorganic 3000 ppm (0.30%)
- Sulphates 500 ppm (0.05%)
- Alkali chlorides 1000 ppm (0.1%)

Water found satisfactory for mixing is suitable for curing concrete. However, the water used for curing should not produce any objectionable stain or deposit on the concrete surface. The pH value shall not be less than 6.5.

4.2.7 Steel Reinforcement

For reinforced cement concrete (RCC) works, the reinforcement/ un-tensioned steel as the case may be shall consist of the following grades of reinforcing bars:

Grade designation	Bar type conforming to governing IS specification	Characteristic strength (f_y) (MPa)	Elastic modulus (GPa)
S 240	IS:432 Part I – Mild steel bar	240	200
S 415	IS:1786 – High yield strength deformed bars	415	200

All steel shall be procured from original producers.

Only new steel shall be delivered to the site. Every bar shall be inspected before assembling on the work and defective, brittle or burnt bar shall be discarded. Cracked ends of bars shall also be discarded.

Whenever specified, either in drawings or BOQ, reinforcement steel i.e. high yield strength deformed bars shall be coated with fusion bonded epoxy coating conforming to IS: 13620. The coating shall be applied to the abrasive blast cleaned heated rod as an electro-statically charged dry powder sprayed on to the grounded steel bar. The coating thickness shall be varying between 0.1 to 0.3 mm after curing. Damaged areas shall be patched up with epoxy patching material as per IS: 13620. Mandrel bending machines shall be used for bending end. Utmost care should be taken for not damaging the coated surface during fabrication and placement of bars. Utmost care shall be taken so that bars are not damaged during handling and transportation.

4.2.8 Structural Steel

All structural steel shall before fabrication comply with the requirement of the following Indian Standards:

Code No.:	Title / Specification
IS:808	Dimensions for hot rolled steel beam, column, channel and angle sections
IS:1148	Hot rolled rivet bars (upto 40 mm dia) for structural purposes
IS:1149	High tensile steel rivet bars for structural purposes
IS:1161	Steel tubes for structural purposes – Specification
IS:1239	Steel tubes, tubulars and other wrought steel fittings – Specification
IS:1730	Dimensions for steel plates, sheet strips and flats for general engineering purposes
IS:1732	Dimensions for round and square steel bars for structural and general engineering purposes
IS:1852	Rolling and cutting tolerances for hot rolled steel products
IS:2062	Hot rolled low, medium and high tensile structural steel
IS:4923	Hollow steel sections for structural use
IS:11587	Structural weather resistant steels

4.2.9 Stainless Steel

Stainless steel shall be austenitic chromium-nickel steel, possessing rust, acid and heat resistant properties conforming to IS: 6603 and IS:6911. Mechanical properties/ grade for such stainless steel shall be as specified by the accepting authority, but in no case be inferior to mild steel. Generally, stainless steel is available as per AISI grades. AISI 304 which is equivalent to grade 04Cr18Ni110 of IS: 6911 satisfies the requirements of mechanical properties of structural steel. Other grades of stainless steel for specific purposes may be provided as per specific requirements. For application in adverse/ corrosive environment, stainless steel shall conform to AISI 316 or equivalent.

4.2.10 Concrete Admixture

Concrete admixtures are proprietary items of manufacture and shall be obtained only from established manufacturers with proven track record, quality assurance and full-fledged laboratory facilities for the manufacture and testing of concrete. The manufacturer should be ISO: 9000/ 14000 certified.

The Contractor shall provide the following information concerning each admixture after obtaining the same from the manufacturer:

(a) Normal dosage and detrimental effects, it any, of under dosage and over dosage
(b) The chemical names of the main ingredients in the admixtures
(c) The chloride content, if any, expressed as a percentage by weight of the admixture
(d) Values of dry material content, ash content and relative density of the admixture which can be used for uniformity tests
(e) Whether or not the admixture leads to the entrainment of air when used as per the manufacturer's recommended dosage and if so to what extent
(f) Where two or more admixtures are proposed to be used in any one mix, confirmation as to their compatibility
(g) There should be no increase in risk of corrosion of the reinforcement or other embedment as a result of using the admixture.

Admixtures shall conform to the requirements of IS:9103. In addition, the following conditions shall be satisfied :

1) 'Plasticisers' and 'Super-plasticisers' shall meet the requirements indicated for 'water reducing admixture'.
2) Except where resistance to freezing and thawing and to disruptive action of deicing salts is necessary, the air content of freshly mixed concrete in accordance with the pressure method given in IS:1199 shall not be more than 2 per cent higher than that of the corresponding control mix and in any case not more than 3 per cent of the test mix.
3) The chloride content of the admixture shall not exceed 0.2 per cent when tested in accordance with IS:6925.

4) Uniformity tests on the admixtures are essential to compare qualitatively the composition of different samples taken from batch to batch or from the same batch at different times.The tests that shall be performed along with permissible variations in the same are indicated below:

   - Dry material content: to be within 3 per cent and 5 per cent of liquid and solid admixtures respectively of the value stated by the manufacturer.
   - Ash content: to be within 1 per cent of the value stated by the manufacturer.
   - Relative density (for liquid admixtures) : to be within 2 percent of the value stated by the manufacturer.

5) All tests relating to the concrete admixtures shall be conducted periodically at an independent laboratory and compared with the data given by the manufacturer.

4.2.11 RCPC Manhole Covers

Reinforced cement polymer concrete (RCPC) manhole covers and frames shall generally conform to IS:12592 (in-so-far-as concrete mixes, steel fibres, shapes, tolerances, load test, sampling and inspection, number of tests, manufacturers certificate) with SS-304 lifting hooks 16 mm ϕ (in place of MS hooks). Dimensions are given in the drawing. The grade of concrete should be M4O. Engineer will check the cube strength of concrete as per IS: 456.

Reinforcement steel or steel fibres shall be provided as per IS: 12592. Together with this polyester fibres shall be used as per manufacturer's recommendation. Concrete admixtures such as super-plasticizers and polymer admixture bounding agents are to be used as per admixture manufacturer's recommendations. The admixtures shall be obtained from manufacturers who have ISO: 9000/ 14000 certification. The manhole cover and frame shall be impregnated with a carbon black pigment.

The dimensions of the manhole covers and frames shall be as shown in drawing with tolerances as per IS: 12592. Curing of concrete for the finished and hardened manhole cover and frame shall be by complete submergence in a curing water tank. Minimum period of curing shall be 14 days. Striking of mould shall be after a period of 24 hrs for normal vibration of concrete or as per manufacturer's recommendation where the concrete is homogenized by compression.

The following information shall be clearly embossed on manhole cover and frame:

- HD 35, 25 or MD 20, 12, 10
- Project name
- …../….. (month and year of manufacture), Manufacturer's name

4.3 Dismantling and Demolition

4.3.1 Scope

This work shall consist of removing, as here-in-after set forth, existing structures below or above GL consisting of concrete, RCC, brickwork, steel work, partitions, wood work, pipes and sewer lines, posts or struts, fencing, wire mesh, culverts, pavements, kerbs and other structures like guard rails, utility services, catch pits, bamboo & wooden bridges etc., which are in place but interfere with the new construction or are not suitable to remain in place, and disposing off the resulting materials and back filling the resulting trenches and pits.

Dismantling and removal operations shall be carried out with such equipment and in such a manner as to leave undisturbed adjacent pavement, structures and any other work to be left in place.

All operations necessary for the removal of any existing structure which might endanger new construction shall be completed prior to the start of new work. Payment shall be made for dismantling as per relevant items in BOQ.

4.3.2 Measurement and Rate

All unusable materials arising from dismantling and demolition shall be disposed off by the Contractor to any suitable site to be arranged by the Contractor. Payment for transporting unusable materials shall be included in the quoted rates. No extra payment shall be made for such disposal.

All serviceable materials (like CI / GI pipes, valves, water meters, stand-posts etc) arising from dismantling and demolition shall be stacked and sent transported as identified by the Engineer-in-charge. Payment for transportation of usable materials shall be considered to be included within the relevant items and no extra payment shall be made.

4.4 Earthwork in excavation

4.4.1 General

This Specification covers the general requirements of earthwork in excavation in different kinds of soil necessary for the laying of pipelines (viz, primary mains) and pipeline appurtenances (viz., Valve chambers, Pipe Pedestals, thrust blocks etc), construction of civil structures (like service reservoirs, pump houses etc) in accordance with requirements of these Specifications along the lines, grades and alignments as shown in the Drawings or as indicated by the Engineer.

This work shall consist of excavation, removal, as well as satisfactory disposal of all materials as outlined in the specification.

The following Standard Codes, unless otherwise specified herein, shall be applicable. In all cases, the latest revision of the codes shall be referred to:

Codes	Description
IS: 1200	Method of Measurement of Earthwork.
IS: 3764	Safety code for excavation work.
IS: 3385	Code of practice for measurement of Civil Engineering Works.
IS: 2720	Method of test of soils (All parts)
IS: 1498	Classification and identification of soils for General Engineering purposes
IS :4081	Safety code for blasting and related drilling operations
IS: 4988	Glossary of terms and classifications of earth moving machinery (All Parts)

Contractor may, for facility of work or similar other reasons excavate, and also backfill later, if so approved by Engineer, at his own cost, outside the lines as directed by Engineer. Should any excavation be taken below the specified levels, Contractor shall fill it up, with coarse graded sand, up to the required elevation. No extra payment shall be claimed by Contractor on this account.

All excavations shall be done to the minimum dimension as required for safety and working facility. Prior approval of Engineer shall be obtained by Contractor in each individual case, for the method he proposes to adopt for the excavation, including setting out, dimensions, side slopes, dewatering, disposal, etc. This approval, however, shall not in any way relieve Contractor of his responsibility for any consequent loss or damage. The excavation must be carried out in the most expeditious and efficient manner. Side slopes shall be as steep as will stand and precaution shall be taken to prevent slips. Should slips occur, the slipped material shall be removed and the slope dressed to a modified stable slope. Removal of the slipped earth will not be paid for if the slips are due to the negligence of Contractor.

All loose boulders, semi-detached rocks (along with earthy stuff which might move therewith) not directly in the excavation but so close to the area to be excavated as to be liable, in the opinion of Engineer, to fall or otherwise endanger the workmen, equipment, or the work, etc., shall be stripped off and removed away from the area of the excavation. The method used shall be such as not to shatter or render unstable or unsafe the portion which was originally sound and safe. All excavation shall be carried out in a manner approved by the Engineer. The works shall be so done that all suitable materials available from excavation are satisfactorily utilized.

Excavation for structures shall consist of the removal of material for the construction of foundation for buildings, tanks, reservoirs, retaining walls, headwalls, cutoff walls, pipe culverts and other similar structures, in accordance with the requirements of these Specifications and the lines and dimensions as per approved drawings or as indicated by the Engineer. The work shall include all necessary sheeting, shoring, bracing, draining and pumping; the removal of all logs, stumps, grubs and other deleterious matter and obstructions, necessary for placing the foundations; trimming bottoms of excavations; and clearing up the site and the disposal of all surplus material.

4.4.2 Works to be kept free of water

The Contractor shall arrange for the rapid dispersal of water collected / accumulated on the earthwork or completed formation during construction or on the existing roadway or which enters the earthwork or any other item of work from any source, and where practicable, the water shall be discharged into the permanent outfall of the drainage system. The arrangement shall be made in respect of all earthworks including excavation for pipe trenches, foundations, or cuttings.

The Contractor shall provide, where necessary, temporary water courses, ditches, drains, pumping or other means for maintaining the earthwork free from water. Such provisions shall include carrying out the work of forming the cut sections and embankments in such manner that their surfaces have at all times a sufficient minimum cross-fall and, where practicable, a sufficient longitudinal gradient to enable them to shed water and prevent ponding.

The works involved in keeping the earthwork or any other item of works free of water shall be deemed as incidental to the respective item of work and as such no separate payment shall be made for the same.

4.4.3 Earthwork Excavation in Trenches for Pipes

This shall comprise of excavation exceeding 1.5 mts in width and 10sqm in plan and to any depth for trenches for Pipes and returning the excavated material to fill the trenches after pipes are laid and their joints tested and passed and disposal of surplus excavated up to 500m lead.

All excavations shall be carried out by mechanical equipment unless, in the opinion of Engineer, the work involved and time schedule permit manual work. The work shall be so done that the suitable material available from excavation are satisfactorily utilized.

The specific scope relates to excavation for pipeline (CI / DI / MS Pipes pipe etc) stretches to be laid within the scope etc including disposal of the surplus earth. The excavation shall confirm to the lines, grades, and levels as directed by the Engineer. The Contractor shall not excavate outside the limits of excavation. Subject to permitted tolerances, any excess depth or width shall be made good at the cost of suitable material.

4.4.4 General requirements

All excavation operations manually or by mechanical means shall include excavation and ‘getting out’ the excavated materials. In case of excavation for trenches, chambers, pipe pedestal or ancillary works ‘getting out’ shall include throwing the excavated materials at a distance of at least one metre or half the depth of excavation, whichever is more, clear off the edge of excavation. In all other cases ‘getting out’ shall include depositing the excavated materials as specified.

While planning or executing excavations, the Contractor shall take all adequate precautions against soil erosion, water pollution etc. During the excavation the natural drainage of the area shall be maintained. The excavations shall be taken out to such widths, lengths, depths, profiles and levels shown on the Drawings or as directed by the Engineer. The Contractor shall not excavate outside the limits of excavation. Subject to the permitted tolerances, any excess depth / width excavated beyond the specified level / dimensions on the Drawings shall be made good at the cost of the Contractor with suitable material of characteristics (with plum concrete or sand or sandy soil and compacted).

All debris and loose material on the slopes of cuttings shall be removed. No backfilling shall be allowed to obtain required slopes except that when boulders or soft materials are encountered in cut slopes, these shall be excavated to approved depth on instructions of the Engineer and the resulting cavities filled with suitable material and thoroughly compacted in an approved manner.

In case of excavation for foundation in trenches or over areas, the bed of excavation shall be to the correct level or slope and consolidated by watering and ramming. If the excavation for foundation is done to a depth greater than that shown in the drawings or as required by the Engineer, the excess depth shall be made good by the contractor at his own cost with the concrete of the mix used for levelling/ bed concrete for foundations.In case the excavation is done wider than that shown on the drawings or as required by the Engineer, additional filling wherever required on the account shall be done by the contractor at his own cost.

In works, if any existing structure gets disturbed or loosened, it shall be dismantled and cut to regular shape and re-laid as directed by the Engineer, at the cost of the Contractor.

4.4.5 Barricading

Excavation where directed by the Engineer shall be securely barricaded and provided with proper caution signs, conspicuously displayed during the day and properly illuminated with red lights and/or written using fluorescent reflective paint as directed by engineer during the night to avoid accident. Suitable barricading shall be provided along the sides of trenches and pits. Fencing / barricading shall particularly be provided at places as directed by the Engineer. The posts shall be securely fixed in the ground not more than 3 m apart and they shall not be less than 1.2 m above the surface of the ground. There shall be two rails, one near the top of the posts and the other about 50 mm above the ground. The method of projecting rails beyond the posts and tying them together where they meet will not be allowed on any account. All along the edges of the excavated trenches a bank of earth about 1.2 m high shall be formed where required by Engineer for further protection.

The lighting, barricading, guarding of the trenches and the maintenance of watchman shall be done by the Contractor at his cost. At every 30 meters interval and at every change in the gradient, sight rails shall be provided and fixed by the Contractor at his own cost. The sight rails and boning rods for checking the excavation and inverts of the pipes shall be of the quality approved by the Engineer. In all streets in the City/Town at every 15 meters interval, blank board shall be provided by the Contractor at his own cost, to facilitate crossing of the trench by the public residing on the either side.

4.4.6 Disposal of Excavated materials

Unsuitable and surplus material not intended for use shall be disposed off within a lead of 500m. If necessary, the surplus material shall be transported and disposed off through mechanical means which shall be paid for separately.

4.4.7 Measurement and Rate

All earthwork in excavation shall be measured net in stages of 1.5 m depth. Dimensions for purpose of payment shall be reckoned on the mean width of trench / excavation multiplied by the mean depth from the surface below the road hard crust (whenever applicable).

Payment for fill inside excavated areas and trenches, with selected excavated material will be made only for compaction as specified/ directed. Cost of all other operations shall deem to have been covered in the rate quoted for excavation.

4.5 Filling with available Earth

4.5.1 Scope

Backfilling of pipe trenches and excavations / foundations shall be done as directed by the Engineer with selected available excavated material as far as possible. Sand and Murum may be used as filling material as directed by Engineer-in-charge, when the selected earth is unsuitable.

The backfilling shall be carried out in such a way as not to cause undue thrust on any part of the construction. The compaction shall be done with the help of suitable equipment such as mechanical tamper, rammer, plate vibrator etc., after necessary watering, so as to achieve atleast 95% proctor density with respect to field density before excavation. Fill material shall be free from clods, salts, sulphates, organic or other foreign material. All clods of earth shall be broken or removed.

In pipe laying work, filling of the trenches shall be carried out simultaneously on both sides of the pipe to avoid unequal pressure on the pipe. The backfilling shall be done very carefully upto 300 mm above the crown of the pipe so as not to damage the pipe or disturb the level. Above this the filling and consolidation may be done at a faster pace as per instructions of Engineer. While consolidating the filled material above the crown of the pipe, care shall be taken not to damage the pipe in any manner.

4.5.2 General Requirements

Earth used for filling shall be free from stone, shingle, or boulder not larger than 75 mm in any direction, salts, organic or other foreign matter. Normally excavated earth from the same area shall be used for filling. However, if such earth contains deleterious material the same shall not be used. All clods of earth shall be broken or removed.

The spaces around the foundations shall be cleared of all debris, brick bats etc. The filling shall be done in layers, not exceeding 200mm in each layer. Each layer shall be watered, rammed, and consolidated before the succeeding one is laid. Earth shall be rammed with iron rammers where feasible and with the butt-ends of crowbars where rammer cannot be used. Special care shall be taken that no damage is caused to the pipes, drains and masonry or concrete in the trenches, under floor, etc.

All fill material will be subject to Engineer's approval. If any material is rejected by Engineer, Contractor shall remove the same forthwith from the site at no extra cost to the Owner. Surplus fill material shall be deposited / disposed off as directed by Engineer after the fill work is completed. No earth fill shall commence until surface water discharges and streams have been properly intercepted or otherwise dealt with as directed by Engineer.

To the extent available, selected surplus spoils from excavated materials shall be used as backfill. Fill material shall be free from clods or organic matter. 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 moorom or earth to fill up the voids and the mixture used for filling.

4.5.3 Filling in Trenches

Filling in trenches shall be commenced soon after the joints of pipes etc. have been pressure tested and passed. The space alround the pipes, shall be cleared of all debris, boulders, pebbles, brick bats etc. Where the trenches are excavated in hard/ soft soil, the filling shall be done with earth on the side and top of pipes in layers not exceeding 20 cm in depth. Each layer shall be watered, rammed and consolidated. All clods and lumps of earth exceeding 8 cm in any direction shall be broken or removed before the excavated earth is used for filling. In case of excavation trenches in ordinary/ hard rock, the filling upto a depth of 30cm above the crown of pipe, cable, conduits etc. shall be done with fine material like earth, moorum or pulverized/ decomposed rock according to the availability at site.

The remaining filling shall be done with boulders of size not exceeding 15cm mixed with fine material like decomposed rock, moorum or earth as available to fill up the voids, watered, rammed and consolidated in layers not exceeding 30cm. Excavated material containing deleterious material, salt peter earth etc. shall not be used for filling.

Ramming shall be done with iron rammers where feasible and with blunt ends of crow bars where rammers cannot be used. Special care shall be taken to ensure that no damage is caused to the pipes, Cables, Conduits etc. laid in the trenches.

4.5.4 Compaction and Testing

In general, requirement of routine testing for backfilling is not being anticipated in this project. However, Engineer may ask for Standard Proctor Density Test for any compacted earth at site without any extra cost. Extent of such testing is expected to be kept limited to one number for every 250m of pipe mains laid. However, actual requirement for such tests shall be at the sole direction of the Engineer.

The compaction shall comply with the specified (Proctor/ Modified Proctor) density at moisture content differing not more than 4 percent from the optimum moisture content. The Contractor shall demonstrate adequately at his cost, by field and laboratory tests that the specified density has been obtained. Back filled material shall be tested to achieve at least 95% degree of compaction (Proctor Density).

To ensure that the fill has been compacted as specified, field and laboratory tests shall be carried out by the Contractor at his cost.

4.5.5 Measurement and Rate

The cubical contents of foundation structures (concrete / masonry) or pipes laid in shall be worked out and the same deducted from the cubical contents of earthwork in excavation for foundations to arrive at the quantity for filling sides of foundation.

The rates shall cover the cost for carrying out all the required filling operations including cost of labour, materials, equipment hired/owned, tools and plants, and incidentals necessary to complete the work.

4.6 Sand or Murum filling in Foundation and Trenches

4.6.1 Scope of work

Backfilling of Pipe trenches and or foundations shall be done by sand filling, when the available earth is unsuitable as a fill material. Wherever sand is used for filling in foundation and trenches, same shall be done in layers not exceeding 150 mm or as directed by the Engineer. Consolidation shall be done by thorough saturation with water and ramming complete.

Sand to filled in foundation and trenches shall be clean and free from dust organic and foreign matter and its grading shall be within the limits of grading zone IV.

4.6.2 Filling and Consolidation

Sand filling shall be done in a manner similar to earth filling in plinth except that consolidation shall be done by flooding with water. The surface of the consolidated sand filling shall be dressed to the required level or slope and shall not be covered till the Engineer-in-Charge has inspected and approved the sand filling.

4.6.3 Measurement and Rate

The length, breadth and depth of consolidated sand shall be measured with steel tape correct to the nearest cm and cubical contents worked out in cubic metres correct to two places of decimal. The rates include the cost of sand, all labour and materials involved in all the operations described above.

4.7 Plain Cement Concrete

4.7.1 Scope

The works consists of providing and placing Plain cement concrete as leveling course in base of foundations, footings, of civil structures (Like buildings, pump houses, in trenches for filling of pockets and depressions, for flooring, as screed concrete / damp proof courses on top of brick walls, concrete blocks, cradles and or on top of slabs as base courses and all miscellaneous works) as shown in drawings and or as directed by the Engineer. Concrete shall be prepared by mixing graded stone aggregate or gravel of normal size as specified with fine aggregate and cement in specified proportions with required quantity of water.

The specific scope includes Providing and placing cement concrete in base / footing / foundation of Valve chambers, Pipe pedestals, Thrust Blocks, Anchor Blocks, Concrete cradles or similar appurtenances structures for laying of pipes as shown in the Drawings and or as per site conditions and or as directed by the Engineer. All Cement Concrete works shall be as per IS: 456.

4.7.2 Proportioning

Unless mentioned otherwise, Proportioning shall be done by volume. Boxes of suitable size shall be used for measuring fly ash, sand and aggregate. The internal dimensions of the boxes shall be generally 35x25x40 cm. deep or as otherwise approved by the Engineer. The unit of measurement of cement shall be a bag of 50 kg and this shall be taken as 0.035 cum. While measuring the aggregate, shaking, ramming, or heaping shall not be done. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand; allowances for bulkage shall be made as given in the chapter for mortar.

4.7.3 Placing and Compaction

The concrete shall be deposited as nearly as practicable in its final position to avoid re-handling. It shall be laid gently (not thrown) and shall be thoroughly vibrated and compacted before setting commences and should not be subsequently disturbed. Method of placing shall be such as to preclude segregation. Care shall be taken to avoid displacement of reinforcement or movement of form work and damage due to rains. As a general guidance, the maximum free fall of concrete may be taken as 1.5 metre.

Concrete shall be thoroughly compacted and fully worked around embedded fixtures and into corners of the form work. Compaction shall be done by mechanical vibrator of appropriate type till a dense concrete is obtained. To prevent segregation, over vibration shall be avoided. Compaction shall be completed before the initial setting starts.

For leveling course, the Engineer may permit compaction by manual compaction by tamping. After compaction the top surface shall be finished even and smooth with wooden trowel before the concrete begins to set.

4.7.4 Measurement and Rate

Quantity shall be calculated as shown in the Drawings. Dimensions of length, breadth and thickness shall be measured correct to nearest cm. except for the thickness of slab and partition which shall be measured to nearest 5 mm. Areas shall be worked out to nearest 0.01 sq.m and the cubic contents of consolidated concrete shall be worked out to nearest 0.01 cum.

Concrete laid in excess, of the sections shown in the drawing unless directed by the Engineer shall not be measured. The rates shall cover the cost for carrying out all the required operations including cost of labour, materials, equipment hired/owned, tools and plants, and incidentals necessary to complete the work.

4.8 Reinforced Cement Concrete

4.8.1 Scope

Reinforced cement concrete work may be cast-in-situ or precast as may be directed by Engineer according to the nature of work and shall consist of providing and placing cement concrete in foundations, footings, columns, pillars, beams, slabs and other miscellaneous structures as shown in the Drawings and or as directed by the Engineer.

The specific scope of the work shall include providing and placing concrete in miscellaneous civil structures (Valve chambers slabs, thrust blocks, pipe cradles, supporting structures for pipes etc), and other ancillary structures as shown in the Drawings and or as directed by the Engineer.

Concrete Grade with Mix proportion lower then, 1:2:4 shall not be used in Reinforced Concrete Works. All Reinforced Concrete works shall be as per IS: 456.

4.8.2 Proportioning

Wherever specified, Proportioning for ingredients of Concrete shall be as per Weight. Proportioning by weight (Design Mix) shall be done by an expert / Concrete Technologist or got done by an institution of repute agreeable to the Engineer-in-charge. Determination of the proportions by weight of cement aggregates and water shall be in accordance to provisions of IS: 10262 and SP: 23.

For Proportioning on volumetric basis, boxes of suitable size shall be used for measuring fly ash, sand and

aggregate. The internal dimensions of the boxes shall be generally 35x25x40 cm. deep or as otherwise approved by the Engineer. The unit of measurement of cement shall be a bag of 50 kg and this shall be taken as 0.035 cum. While measuring the aggregate, shaking, ramming, or heaping shall not be done. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand; allowances for bulkage shall be made as given in the chapter for mortar.

4.8.3 Workability of Concrete

The concrete mix proportion chosen should be such that the concrete is of adequate workability for the placing conditions of the concrete and can properly be compacted with the means available. The quantity of water to be used for each mix of 50kg cement, to give the required consistency shall not be more than 34 litres for 1:3:6 mix, 30 litres for 1:2:4 mix, 27 litres for 1:1.5:3 mix. In the case of vibrated concrete, the limit specified may be suitably reduced to avoid segregation. The quantity of water shall be regulated by carrying out regular slump tests. Suggested ranges of workability of concrete measured shall be in accordance with IS 1199.

4.8.4 Machine Mixing

The mixer drum shall be flushed clean with water. Measured quantity of coarse aggregate shall be placed first in the hopper. This shall be followed with measured quantity of fine aggregate and then cement. In case fine aggregate is damp, half the required quantity of coarse aggregate shall be placed in the hopper, followed by fine aggregate and cement. Finally the balance quantity of coarse aggregate shall be fed in the hopper, & then the dry materials are slipped into the drum by raising the hopper. The dry material shall be mixed for atleast four turns of the drum. While the drum is rotating, water shall be added gradually to achieve the water cement ratio as specified or as required by the Engineer. After adding water, the mixing shall be continued until concrete of uniform colour, uniformly distributed material and consistency is obtained. Mixing shall be done for atleast two minutes after adding water. If there is segregation after unloading from the mixer, the concrete should be remixed. The drum shall be emptied before recharging. When the mixer is closed down for the day or at any time exceeding 20 minutes, the drum shall be flushed cleaned with water.

The materials shall be mixed for a period of not less than 2 minutes and until a uniform colour and consistency is obtained. The time shall be counted from the moment all the materials have been put into the drum.

4.8.5 Placing

The concrete shall be deposited as nearly as practicable in its final position to avoid rehandling. It shall be laid gently (not thrown) and shall be thoroughly vibrated and compacted before setting commences and should not be subsequently disturbed. Method of placing shall be such as to preclude segregation. Care shall be taken to avoid displacement of reinforcement or movement of form work and damage due to rains.

Concreting shall commence only after Engineer has inspected the centering, shuttering and reinforcement as placed and passed the same. Shuttering shall be clean and free from all shavings, saw dust, pieces of wood, or other foreign material.

The concrete shall be deposited in its final position in a manner to preclude segregation of ingredients. In deep trenches and footings concrete shall be placed through chutes or as directed by the Engineer. In case of columns, Pillars, walls, the shuttering shall be so adjusted that the vertical drop of concrete is not more than 1.5 metres at a time.

It is necessary to ensure that the time between mixing and placing of concrete shall not exceed 30 minutes so that the initial setting process is not interfered with.

4.8.6 Compaction

Concrete shall be compacted into dense mass immediately after placing by means of mechanical vibrators designed for continuous operations. Concrete shall be thoroughly compacted and fully worked around embedded fixtures and into corners of the form work. To prevent segregation, over vibration shall be avoided. Compaction shall be completed before the initial setting starts.

For leveling course, the Engineer may permit compaction by manual compaction by tamping. After compaction the top surface shall be finished even and smooth with wooden trowel before the concrete begins to set.

The Engineer may however relax this condition at his discretion for certain items depending on the thickness of the members and feasibility of vibrating the same and permit hand compaction instead.

The layers of concrete shall be so placed that the bottom layer does not finally set before the top layer is placed. The vibrators shall maintain the whole of concrete under treatment in an adequate state of agitation; such that de-aeration and effective compaction is attained at a rate commensurate with the supply of concrete from the mixers. The vibration shall continue during the whole period occupied by placing of concrete, the vibrators being adjusted so that the centre of vibrations approximates to the centre of the mass being compacted at the time of placing.

Concrete shall be judged to be properly compacted, when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. When this condition has been attained, the vibrator shall be stopped in case of vibrating tables and external vibrators. Needle vibrators shall be withdrawn slowly so as to prevent formation of loose pockets in case of internal vibration. In case both internal and external vibrators are being used, the internal vibrator shall be first withdrawn slowly after which the external vibrators shall be stopped so that no loose pocket is left in the body of the concrete. The specific instructions of the makers of the particular type of vibrator used shall be strictly complied with. Shaking of reinforcement for the purpose of compaction should be avoided. Compaction shall be completed before the initial setting starts, i.e. with 30 minutes of addition of water to the dry mixture.

4.8.7 Curing

Green work shall be protected from rain by suitable covering. The work should also be protected from damage and rain during construction. After the concrete has begun to harden i.e. about 1 to 2 hours after its laying, it shall be protected with moist gunny bags, sand or any other material approved by the Engineer against quick drying. After 24 hours of laying of concrete, the surface shall be cured by flooding with water of minimum 25mm depth, or by covering with wet absorbent materials. The curing shall be done for a minimum period of 14 days. In special cases, curing may have to be done for more number of days as required by the Engineer.

Over the foundation concrete, the masonry work may be started after 48 hours of it's laying, but the curing of cement concrete shall be continued along with the masonry work for minimum period of 14 days. Where cement concrete is used as sub-grade for flooring, the flooring may be commenced before the curing period of sub-grade is over but the curing of sub-grade shall be continued along with the top layer of flooring for a minimum period of 14 days. The water used for curing shall not produce any objectionable stains or unsightly deposit on concrete surface. In special circumstances and locations curing by other means such as sealing material insulating blankets etc. may be adopted with the specific prior approval of the Engineer.

4.8.8 Testing of Concrete Cubes

Number of sample cubes cast shall be as specified in IS: 456. A minimum of 6 sample cubes shall be cast, three cubes shall be tested at seven (7) days, and three cubes shall be tested at twenty-eight (28) days.

4.8.9 Measurement and Rate

The length, breadth, and thickness of concrete works as shown in Drawings considered and the cubical contents calculated correct to 0.01cu.m. Plain and moulded work shall be measured separately and the work shall be classified and measured separately in cubical contents. Formwork and Reinforcement shall be measured separately.

The rate is inclusive of cost of labour and materials involved in all the operations described above except cost of reinforcement and formwork which shall be paid for separately.

4.9 Formwork

4.9.1 Scope

Form work shall include all temporary or permanent forms or moulds required for forming the concrete (Plain cement Concrete or Reinforced Cement Concrete) which is cast-in-situ, together with all temporary construction required for their support.

The specific scope shall include providing all temporary and permanent forms for casting of concrete in position for Civil structures, pipe pedestals, Thrust blocks, Anchor Blocks, valve chambers, drains, coping concrete, and all miscellaneous appurtenant structures as shown in the drawings and or as per site requirement and or as directed by the Engineer.

4.9.2 General Requirements

It shall be strong enough to withstand the dead and live loads and forces caused by ramming and vibrations of concrete and other incidental loads, imposed upon it during and after casting of concrete. It shall be made sufficiently rigid by using adequate number of ties and braces, screw jacks or hard board wedges where required shall be provided to make up any settlement in the form work either before or during the placing of concrete.

Form shall be so constructed as to be removable in sections in the desired sequence, without damaging the surface of concrete or disturbing other sections, care shall be taken to see that no piece is keyed into the concrete.

The formwork shall consist of shores, bracings, sides of walls, beams, bottom of slabs; domes etc including ties, anchors, hangers, inserts and shall be properly designed and planned for the proposed reservoirs and break pressure tank. False work shall be so constructed that vertical adjustments can be made to compensate for take up and settlements. Wedges may be used at the top or bottom of timber shores, but not at both ends, to facilitate vertical adjustment or dismantling of the formwork.

4.9.3 Materials of Formwork

Propping and Centering – All propping and centering should be either of steel tubes with extension pieces or built up sections of rolled steel.

Shuttering - Shuttering used shall be of sufficient stiffness to avoid excessive deflection and joints shall be tightly butted to avoid leakage of slurry. If required, rubberized lining of material as approved by the Engineer shall be provided in the joints.

Normally Steel Shuttering shall be used. Steel shuttering used for concreting should be sufficiently stiffened. The steel shuttering should also be properly repaired before use and properly cleaned to avoid stains, honey combing; seepage of slurry through joints etc. of the required size shall be used

For, minor works 12 mm thick water proofing ply of approved quality may be used with approval of the Engineer. For special finishes the formwork may be lined with plywood, steel sheets, oil tempered hard board, etc. Sliding forms and slip forms may be used with the approval of Engineer.

Form work shall be properly designed for self-weight, weight of reinforcement, weight of fresh concrete, and in addition, the various live loads likely to be imposed during the construction process (such as workmen, materials and equipment).

4.9.4 Camber

Suitable camber shall be provided in horizontal members of structure, especially in cantilever spans to counteract the effect of deflection. The formwork shall be so assembled as to provide for camber. The camber for beams and slabs shall be 4 mm per metre (1 to 25) or as directed by the Engineer, so as to offset the subsequent deflection. For cantilevers the camber at free end shall be 1/50th of the projected length or as directed by the Engineer.

4.9.5 Removal of Formwork

Contractor shall record on the Drawing or on a special register the date upon which the concrete is placed in each part of the work and the date on which the shuttering is removed there-from.

In no circumstances shall forms be struck until the concrete reaches strength of at least twice the stress due to self-weight and any construction / erection loading to which the concrete may be subjected at time of striking

formwork.

Informal circumstances (generally where temperatures are above 20°C) forms may be struck after expiry of the following periods:

Type of Formwork	**Minimum Period before Striking Formwork**
Vertical Formwork to Columns, Walls and Beams	16 – 24 Hours
Soffit Formwork to slabs (Propos to be re-fixed immediately after removal of Formwork)	3 days
Soffit Formwork to Beams (Props to be re-fixed immediately after removal of Formwork)	7 days
Removal of props to slabs: - Spanning up to 4.5 m - Spanning over 4.5 m	 7 days 14 days
Removal of props to beams & arches: - Spanning up to 6 m. - Spanning over 6 m.	 14 days 21 days

Striking shall be done slowly with utmost care to avoid damage to arise and projections and without shock or vibration, by gently easing the wedges. If after removing the formwork, it is found that timber has been embedded in the concrete, it shall be removed and made good as specified earlier. Reinforced temporary openings shall be provided, as directed by Engineer, to facilitate removal of formwork which otherwise may be inaccessible.

Tie rods, clamps, form bolts, etc. which must be entirely removed from walls or similar structures shall be loosened neither sooner than 24 hours nor later than 40 hours after the concrete has been deposed. Ties, except those required to hold forms in place, may be removed at the same time. Ties, withdrawn from walls and grade beams shall be pulled toward the inside face. Cutting ties back from the faces of walls and grade beams will not be permitted.

4.9.6 Measurement and Rate

Where it is stipulated that the formwork shall be paid for separately, measurement shall be taken of the area of shuttering in contact with the concrete surface. Dimensions of formwork shall be measured correct to 10mm. The measurements shall be taken separately under each of the items mentioned above.

Where it is not specifically stated in the description of the item that formwork shall be paid for separately, the rate of the R.C.C. item shall be deemed to include the cost of formwork. No deductions from the shuttering due to the openings/ obstructions shall be made if area of such openings/obstructions does not exceed 0.1sq.m. Nothing extra shall be paid for forming such openings. The rate of formwork includes the cost of labour, materials tools and plant required for all the operations described in this section including properly supporting the members until the concrete is cured, set, and hardened as required. No separate payment shall be made for items such as form release agent, connections, provisions for openings and other items required for the completion of the work unless specified otherwise.

4.10 Brick Masonry

4.10.1 Scope

This work shall consist of construction of general load bearing structures with brick jointed together by cement mortar as specified in accordance with the details shown on the Drawings, Specifications or as directed by the Engineer. The grade or class of bricks should be as per material specification.

The specific scope includes construction of various civil structures (like pump house, office building etc) including

pipeline appurtenant structures (viz., chambers, pipe supports, road-side drains etc) of class designation as shown in the Drawings / BoQ and or as directed by the Engineer.

The following Standard Codes, unless otherwise specified herein, shall be applicable. In all cases, the latest revision of the codes shall be referred to:

Codes	Description
IS - 1077	Specifications for common burnt clay building bricks
IS - 1200	Measurements for Building works
IS - 1905	Code of practice for structural safety of buildings: Masonry walls.
IS - 2116	Sand for masonry mortars
IS - 2212	Code of practice for brick work
IS - 3466	Specification for masonry cement

Others, IS Codes not specifically mentioned here but pertaining to the use of bricks for structural purposes form part of these Specifications.

4.10.2 Soaking of Bricks

Bricks shall be soaked in water before use for a period for the water to just penetrate the whole depth of the bricks. Alternatively bricks may be adequately soaked in stacks by profusely spraying with clean water at regular intervals for a period not less than six hours. When the bricks are soaked they shall be removed from the tank sufficiently early so that at the time of laying they are skin-dry. Such soaked bricks shall be stacked on a clean place where they are not again spoiled by dirt earth etc.

4.10.3 Cement mortar for Brickwork

Cement and sand shall be mixed in specified proportions given in the Drawings. Cement shall be proportioned by weight, taking the unit weight of cement as 1.44 tonne per cubic metre. Sand shall be proportioned by volume taking into account due allowance for bulking. All mortar shall be mixed with a minimum quantity of water to produce desired workability consistent with maximum density of mortar. The mix shall be clean and free from injurious type of soil/acid/alkali/organic matter or deleterious substances.

The mixing shall preferably be done in a mechanical mixer operated manually or by power. Hand mixing can be resorted to as long as uniform density of the mix and its strength are assured subject to prior approval of the Engineer. Where permitted by the Engineer, Hand mixing operation shall be carried out on a clean water-tight platform, where cement and sand shall be first mixed dry in the required proportion by being turned over and over, backwards and forwards several times till the mixture is of uniform colour. Thereafter, minimum quantity of water shall be added to bring the mortar to the consistency of a stiff paste. The mortar shall be mixed for at least two minutes after addition of water.

Mortar shall be mixed only in such quantity as required for immediate use. The mix which has developed initial set shall not be used. Initial set of mortar with ordinary Portland cement shall normally be considered to have taken place in 30 minutes after mixing. In case the mortar has stiffened during initial setting time because of evaporation of water, the same can be re-tempered by adding water as frequently as needed to restore the requisite consistency, but this re-tampering shall not be permitted after 30 minutes. Mortar unused for more than 30 minutes shall be rejected and removed from site of work.

4.10.4 Joints

The thickness of joints shall not exceed 10 mm. All joints on exposed faces shall be tooled to give concave finish. All face joints shall be raked to a minimum depth of 15mm by raking tool during the progress of work when the mortar is still green so as to provide proper key for the plaster or pointing to be done. Where, plastering or pointing is not required to be done the joints shall be struck flush and finished at the time of laying.

4.10.5 Laying

All brickwork shall be laid in an English bond, even and true to line, in accordance with the Drawing or as directed

by the Engineer, plumb and level and all joints accurately kept. Half-cut bricks shall not be used except when necessary to complete the bond. Closer in such cases shall be cut to the required size and used near the ends of the walls. The bricks used at the face and also at the angles forming the junction of any two walls shall be selected whole bricks of uniform size, with true and rectangular faces.

All bricks shall be laid with frogs up on a full bed of mortar except in the case of tile bricks. Each brick shall be properly bedded as set in position by slightly pressing while laying, so that the mortar gets into all their surface pores to ensure proper adhesion. All head and side joints shall be completely filled by applying sufficient mortar to brick already placed and on brick to be placed. All joints shall be properly flushed and packed with mortar so that no hollow spaces are left. No bats or cut bricks shall be used except to obtain dimensions of the different courses for specified bonds or wherever a desired shape so requires.

The brick work shall be built in uniform layers, and for this purpose wooden straight edge with graduations indicating thickness of each course including joint shall be used. Corners and other advanced work shall be raked back. Brickwork shall be done true to plumb or in specified batter. All courses shall be laid truly horizontal and vertical joints shall be truly vertical. Vertical joints in alternate courses shall come directly one over the other. During construction, no part of work shall rise more than one metre above the general construction level, to avoid unequal settlement and improper jointing. Where this is not possible in the opinion of the Engineer, the works shall be raked back according to the bond (and not toothed) at an angle not steeper than 45 degrees with prior approval of the Engineer. Toothing may also be permitted where future extension is contemplated.

Before laying bricks in foundation, the foundation slab shall be thoroughly hacked, swept clean and wetted. A layer of mortar not less than 12 mm thick shall be spread on the surface of the foundation slab and the first course of bricks shall be laid.

4.10.6 Curing

Green work shall be protected from rain by suitable covering and shall be kept constantly moist on all faces for a minimum period of seven days. Brick work carried out during the day shall be suitably marked indicating the date on which the work is done so as to keep a watch on the curing period. Top of the masonry work shall be left flooded with water at the close of the day. Watering may be done carefully so as not to disturb or wash out the green mortar. During hot weather, all finished or partly completed work shall be covered or wetted in such a manner as will prevent rapid drying of the brickwork.

During the period of curing of brick work, it will be suitably protected from all damages. At the close of day's work or for other period of cessation, watering and curing shall have to be maintained. Should the mortar perish i.e., become dry, white or powdery, through neglect of curing, work shall be pulled down and rebuilt as directed by the Engineer. It any stains appear during watering, the same shall be removed from the face.

4.10.7 Finishing of Surfaces

All brickwork shall be finished in a workmanlike manner with the thickness of joints, manner of striking or tooling as described in these above Specifications. For a surface which is to be subsequently plastered or pointed, the joints shall be squarely raked out to a depth of 15 mm, while the mortar is still green. The raked joints shall be well brushed to remove dust and loose particles and the surface shall be thoroughly washed with water, cleaned, and wetted.

Jointing - In jointing, the face of the mortar shall be worked out while still green to give a finished surface flush with the face of the brick work. The faces of brick work shall be cleaned to remove any splashes of mortar during the course of raising the brick work.

Pointing - Pointing shall be carried out using mortar not leaner than 1:3 by volume of cement and sand or as shown on the Drawing. The mortar shall be filled and pressed into the raked joints before giving the required finish. The pointing shall be ruled type for which it shall, while still green, be ruled along the centre with half round tools of such width as may be specified by the Engineer. The super flush mortar shall then be taken off from the edges of the lines and the surface of the masonry shall be cleaned of all mortar. The work shall conform to IS: 2212.

4.10.8 Measurement and Rate

Unless otherwise specified, all work shall be measured net as fixed in its proper position. Any extra work done by the contractor over the specified dimensions shall be ignored. Dimensions shall be measured correct to 10mm. Areas shall be worked out in sq.m correct to two places of decimal. Cubic contents shall be worked out in cu.m correct to two places of decimal.

The rate shall include the cost of materials and labour required for all the operations described above. This shall include the following:

- Brick-on-edge courses, cut brick corners, splays, reveals, cavity walls, brickwork curved on plan to a mean radius exceeding 6 metres.
- Raking out joints for plastering or pointing done as a separate item or finishing joint flush as the work proceeds.
- Preparing tops and sides of existing walls for raising and extending.
- Rough cutting and waste for forming gables, cores, skewbacks and spandrels of arches, splays at eaves and all rough cutting, unless otherwise specified.

4.11 Cement Plaster

4.11.1 Scope

The work shall constitute of providing Cement plaster over exposed concrete or brick surfaces (of thickness 6mm, 12 mm, 15 mm or 20 mm) and or as per the required mix proportion stated as specified in the item, drawing and or directed by the Engineer.

The specific scope includes providing cement plaster over exposed brick surfaces of buildings (for Office Building, Pump house, valve chambers or chamber for flow-meters etc) and other appurtenant structures as shown in the drawings and or as directed by the Engineer.

4.11.2 Preparation of Surfaces

For, brick surfaces, the joints shall be raked out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scraping. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced.

In case of concrete surface, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarder is left on the surface. The joints of masonry shall be raked out properly so that the plaster is well keyed with the masonry.

4.11.3 Mortar

The mortar of the specified mix described in the item shall be used. For external work and under coat work, the fine aggregate shall conform to grading IV. For finishing coat work the fine aggregate conforming to grading zone V shall be used.

4.11.4 Scaffolding

For all brick work, double scaffolding independent of the work having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed.

For all other work in buildings, single scaffolding shall be permitted. In such cases the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not be allowed in pillars/column less than one metre in width or immediately near the skew backs of arches. The holes left in masonry works for scaffolding purposes shall be filled and made good before plastering.

4.11.5 Application of Plaster

Plaster on top (ceiling) shall be completed before commencement of plaster on sides (walls). Plastering shall be started from the top and worked down towards the bottom (floor). All put-log holes shall be properly filled in advance of the plastering as the scaffolding is being taken down. To ensure even thickness and a true surface, plaster about 15 x 15 cm shall be first applied, horizontally and vertically, at not more than 2 metres intervals over the entire surface to serve as gauges. The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface. The mortar shall then be laid on the wall, between the gauges with trowel. The mortar shall be applied in a uniform surface slightly more than the specified thickness. This shall be beaten with thin strips of bamboo about one metre long to ensure through filling of the joints, and then brought to a true surface, by working a wooden straight edge reaching across the gauges, with small upward and side ways movements at a time. Finally the surface shall be finished off true with trowel or wooden float according as a smooth or sandy granular texture is required. Excessive troweling or over working the float shall be avoided. During this process, a solution of lime putty shall be applied on the surface to make the later workable.

All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arises, provision of grooves at junctions etc., where required shall be done without any extra payments. Such rounding, chamfering or grooving shall be carried out with proper templates or battens to the sizes required.

When suspending work at the end of the day, the plaster shall be left, cut clean to line both horizontally and vertically. When recommencing the plastering, the edge of the old work shall be scrapped cleaned and wetted with lime putty before plaster is applied to the adjacent areas, to enable the two to properly joint together. Plastering work shall be closed at the end of the day on the body of wall and not nearer than 15 cm to any corners or arises. It shall not be closed on the body of the features such as plasters, bands and cornices, nor at the corners of arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakages. No portion of the surface shall be left out initially to be patched up later on.

4.11.6 Finish and Thickness

The plaster shall be finished to a true and plumb surface and to the proper degree of smoothness as required. The work shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long and with plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds.

The thickness of the plaster specified shall be measured exclusive of the thickness of key i.e. grooves or open joints in brick work. Average thickness of plaster shall not be less than the specified thickness of 12mm. The minimum thickness over any portion of the surface shall not be less than specified thickness by more than 3 mm. The average thickness should be regulated at the time of plastering by keeping suitable thickness of the gauges. Extra thickness required in dubbing behind rounding of corners at junctions of wall or in plastering of masonry cornices etc., will be ignored. Thickness of plaster greater then 12mm shall be done in two layers.

4.11.7 Curing

Curing shall be started as soon as the plaster has hardened sufficiently not to be damaged when watered. The same may be started 24 hours after finishing the plaster. The plaster shall be kept wet for a period of seven days. During this period, it shall be suitably protected from all damages at the Contractor's expense by such means as the Engineer may approve. The dates on which the plastering is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched.

4.11.8 Precaution

Any cracks which appear in the surface and all portions which sound hollow when tapped, or are found to be soft or otherwise defective, shall be cut out in rectangular shape and redone as directed by the Engineer.

- When ceiling plaster is done, it shall be finished to chamfered edge at an angle at its junction with a suitable tool when plaster is being done. Similarly when the wall plaster is being done, it shall be kept separate

from the ceiling plaster by a thin straight groove not deeper than 6 mm drawn with any suitable method with the wall while the plaster is green.

- To prevent surface cracks appearing between junctions of column/beam and walls, the plastering of walls and beam/column in one vertical plane junction should be carried out in one go.

4.11.9 Measurement and Rate

Length and breadth shall be measured correct to 10 mm and its area shall be calculated in square metres correct to two places of decimal. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves, or open joints in brick works. The measurements of wall plaster shall be taken between the walls or partitions (the dimensions before plastering shall be taken) for the length, and from the top of the floor or skirting to the ceiling for the height. Depth of coves or cornices if any shall be deducted.

The contract price shall include the cost of all labour and materials involved in all the operations described above.

4.12 Providing and Laying Steel Reinforcement

4.12.1 Scope

The work shall consist of providing, laying cutting, bending, binding steel reinforcement for foundations, footings, beams, walls, slabs, columns, pillars and or similar components for valve chambers, pipe pedestals, anchor blocks, drains etc that maybe required to be constructed during execution of the works.

Since, the works will be carried out at various locations; the contractor shall ensure a suitable yard, for cutting, bending, binding of bars, from where reinforcement can be carried out to the work site.

4.12.2 Bending of Reinforcement

Reinforcing bars supplied bent or in coils, shall be straightened before they are cut to size. Straightening of bars shall be done in cold and without damaging the bars. This is considered as a part of reinforcement bending fabrication work.

All bars shall be accurately bent according to the sizes and shapes shown on the detailed working drawings and bar bending schedules prepared by the Contractor as per the construction drawings and approved by the Engineer. They shall be bent gradually by machine or other approved means. Reinforcing bars shall not be straightened and rebent in a manner that will injure the material and bars containing cracks or splits shall be rejected. They shall be bent cold, except bars of over 25 mm in diameter which may be bent hot if specifically approved by the Engineer.

Bars which depend for their strength on cold working shall not be bent hot. Bars bent hot shall not be heated beyond cherry red colour (not exceeding 845 ^{0}C) and after bending, shall be allowed to cool slowly without quenching. Bars incorrectly bent shall be used only if the means used for straightening and re-bending is such as shall not, in the opinion of the Engineer, injure the material. No reinforcement shall be bent when in position in the work without approval, whether or not it is partially embedded in hardened concrete. Bars having kinks or bends other than those required by design shall not be used. All reinforcement bars shall be bent with mandrel bending machines especially if they are fusion epoxy bonded.

4.12.3 Reinforcement Cover

Reinforcement for footings, grade beams, and slabs on sub grade shall be supported on pre cast concrete blocks as approved by Engineer. The use of pebbles or stones shall not be permitted. The 28 day crushing strength of cement mortar cubes / pre cast concrete cover blocks shall be at least equal to the specified strength of concrete in which these cubes / blocks are embedded. The minimum clear distance between reinforcing bars shall be in accordance with IS: 456 or as shown in Drawings. Minimum clear cover shall be as indicated on the drawings. Where cover is not indicated on the drawings, it shall be in accordance with the following:

Location	Clear Cover
Slabs	20 mm

Beams - main reinforcement	30 mm
Beams – stirrups	20 mm
Columns – main reinforcement	40 mm
Column – ties	20 mm
Footings	75 mm

4.12.4 Lapping of Reinforcement

Overlapping of bars shall be as indicated on the drawings. The overlapping bars shall not touch each other and these shall be kept apart by 25mm or 1.25 times the maximum size of the coarse aggregate whichever is greater, with concrete between them. But where this cannot be done, the overlapping shall be bound together at intervals not exceeding twice the diameter of such bars, with two strands of annealed steel wire of 0.90 mm to 1.6 mm thickness twisted tight.

The overlaps shall be staggered for different bars and located at points, along the span, where shear or bending moment is not at maximum. Where lap length is not explicitly shown on the drawings, the length shown in the following table shall be used:

Bar Size	Lap Length
10mm	300mm
12mm	350mm
16mm	600mm
20mm	900mm
25mm	1100mm

The ends of rods shall be bent in to semi circular hooks, having clear diameter equal to four times the diameter of the bar, with a length, beyond the bend equal to four times the diameter of the bar.

4.12.5 Reinforcement placing and Fixing

Fabricated reinforcement bars shall be placed as directed by the Engineer or as shown in the drawing that will be issued. The agency in retrospect shall submit a bar bending schedule, based on the drawings or as per reinforcement laid at site.

The bars crossing one another shall be tied together at every intersection with two strands of annealed steel binding wire twisted tight to make the skeleton of the steel work rigid so that the reinforcement does not get displaced during deposition of concrete. Tack welding in crossing bars shall not be permitted.

Reinforcement shall be accurately fixed by any approved means and maintained in the correct position by the use of blocks, spacers, and chairs as per IS: 2502 to prevent displacement during placing and compaction of concrete.

4.12.6 Inspection

Erected and secured reinforcement shall be inspected and approved by the Engineer prior to placement of concrete.

4.12.7 Measurement and Rate

Reinforcement including authorised spacer bars and laps shall be measured in lengths of different diameters, as actually used in the work nearest to 10mm and their weight calculated on the basis of standard tables (Clause 6.2 of IS:1786). Wastage and un-authorised overlaps shall not be paid for. Annealed steel wire required for binding or tack welding shall not be measured, its cost being included in the rate of reinforcement.

The rate of reinforcement shall include the cost of labour and materials (reinforcement, black annealed wire etc) as required for all operations described above such as cleaning of reinforcement bars, straightening, cutting, hooking bending, binding, placing in position etc. as required or directed including tack welding on crossing of bars in lieu of binding with wires. No separate payment will be made for concrete spacer blocks, timber templates, binding wire or any other accessories required for the performance of the work. No separate payment shall also be considered for carriage of reinforcement from the yard to the work site.

4.13 Construction of Brick Masonry Chambers

4.13.1 Scope of work

The scope of work involves construction of brick masonry chambers for housing / protection of butterfly / sluice / air valves / flow-meters and or similar pipeline appurtenant structures.

4.13.2 Specific requirements

Valve chambers/ meter chambers shall be constructed according to the typical drawings and requirements spelt in the bill of quantities and or direction of the Engineer-in-charge. The chambers shall be suitable for the respective valve/meter and special arrangement to be given by Engineer- In- Charge. They shall be constructed in brick masonry with cement plaster on the walls. The top slab cover shall be cast in situ in reinforced concrete.

The chambers shall be constructed after the laying of the pipes and the assembly of specials and valves. The size of the chambers shall be according to the following criteria as per direction of engineer in charge.

- distance of flanges from walls: 60 cm
- distance of sockets from walls: 60 cm
- distance between highest point of equipment and roof slab: 30 cm

All masonry chambers shall have PCC bedding (of 1:3:6 mix). Inside walls of the chambers shall be plastered with 12mm thick 1:3 cement: sand mortar. All chambers shall be covered with pre-cast RCC slabs (M-15) of minimum 150mm thickness, suitable to carry over-burden load. A suitable locking device may be got constructed by Engineer-In-Charge, if required at site. Large masonry chambers shall be provided with PVC encapsulated rungs for easy access to the chambers.

4.13.3 Measurement and rate

Construction of masonry Chambers shall be enumerated in numbers. The rate includes cost of all work components involved including excavation, back-filling, construction of masonry chamber as per drawing, technical specifications and or direction of the Engineer-in-charge all complete.

Chapter 5 Specifications for Road Works

The works for cutting and restoration works shall be done in close co-ordination with local authorities. As and where required, the bituminous surfaces dismantled during road cutting / excavation for pipe laying shall be re-laid to the satisfaction of the Engineer-in-charge. The specifications for MoRTH and IRC shall be consulted wherever applicable.

5.1 Dismantling WBM / Bituminous Roads

5.1.1 Scope of Work

The scope of the works relates to cutting /dismantling of bituminous and WBM road surfaces for laying of pipes, installation of valves and pipeline appurtenances. The surfaces likely to be encountered are:

- Surface treated service roads (Single wearing course)
- Normal bituminous macadam roads (With Bituminous macadam overlaid with wearing course)
- Heavy duty bituminous roads (2 or more bituminous courses topped with wearing course)

5.1.2 Dismantling

All road cuttings shall be done with due permission of the Engineer. Cutting shall be straight and uniform in width. Soling stone and aggregate obtained from cutting macadam shall be stacked separately, clear of the road surface. Aggregate shall be screened. Stones of size below 20 mm and with rounded edges shall be discarded and disposed.

5.1.3 Road restoration

Exposed edges of the existing carriageway shall be cut vertically to a uniform line consistent with the width of the trench. After the trenches have been filled in with excavated earth in layers of 15 cm thickness, watered, well consolidated with heavy iron rammers and brought to sub grade level, soling stone obtained from cutting shall be laid as per existing soling and consolidated with heavy iron rammers. Where the earth consolidation is well done, no settlement need occur subsequently, for this excess watering should be avoided.

5.1.4 Settlement during restoration

The contracting agency shall maintain constant vigilance over the surfaces constructed and shall be responsible for their appearance and repair during a three months settlement period. As and when depressions occur in the temporary restoration these shall be promptly filled by the Contractor to a level flush with the adjacent surface and adequately sealed.

5.1.5 Measurement and Rate

The length and width of cutting shall be measured correct to a cm. The area shall be calculated in Square metre, correct to two decimal places.

Road cutting / dismantling for laying of pipe / valve chambers and or similar activity shall be paid as per actual measurements. The thickness will be determined based on the compacted depth of the bituminous / water bound macadam courses to be achieved. The rate shall include the cost of materials and labour involved in cutting, dismantling the bituminous / WBM portion, as applicable to the satisfaction of the Engineer.

5.2 Laying of Cement Concrete Pavement

5.2.1 Scope of Work

The scope of work relates to laying of concrete of required mix for restoring cement concrete pavements that may have been dismantled for laying of pipes, valves etc. Material specification shall confirm to relevant specifications. Jointing of old and new concrete shall be done by using NITO bond or similar bonding agent acceptable to the Engineer.

5.2.2 Compaction of Concrete

Compaction shall be carried out by electrically (or) diesel / petrol operated needle vibrators. At the discretion of the Engineer, for compaction at edges and joints, vibrators may be supplemented by hand tamping and rodding for securing satisfactory results. Under no circumstances, honey combing of concrete at joints or elsewhere shall be permitted. Concreting shall be carried out in one operation between the expansion joints and construction joints without any break at the dummy joints.

5.2.3 Finishing

During compaction, any low or high spots shall be made up by adding or removing concrete. Any depressions or high spots showing departure from the true surface shall be immediately rectified. High spots shall be cut down and refinished. Depressions shall be enlarged to about 8-10 cm and filled up with fresh concrete, compacted and finished.

The pavement shall be given a broom finish with an approved steel or fiber broom. The broom shall be pulled gently over the surface of the pavement from edge to edge. Adjacent strokes shall be slightly overlapped.

5.2.4 Measurement and Rate

The measurement shall be done as per actual dimensions on the field correct to 5mm. The thickness of the concrete pavement slabs shall be taken on either side of the pavement.

The rate of the item for concrete in pavement shall include the cost of all labour and materials including charges for machinery tools, plants, curing etc all complete required for construction of the concrete pavement.

5.3 Lying of WBM surfaces

5.3.1 Scope of Work

The work shall consist of laying of water bound macadam on stretches excavated for laying of pipes, valves, pipeline appurtenances etc and to restore them to the original condition. Fresh aggregate of nominal size 63mm - 45 mm shall only be used and spread over a depth of 7.5 cm in each layer.

5.3.2 Laying of WBM surfaces

The coarse aggregate shall be spread uniformly and evenly upon the prepared base in required quantities with a twisting motion to avoid segregation. In no case shall these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed base be permitted. The W.B.M. sub-base shall be normally constructed in layer of 100 mm compacted thickness and W.B.M. base shall be normally constructed in layers of 75 mm compacted thickness. No segregation of large or fine particles shall be allowed and the coarse aggregate as spread shall be of uniform gradation with no pockets of fine material.

This shall then be consolidated with hand roller or heavy iron rammers, as directed, first with light sprinkling then with sufficient application of water till the aggregate has become adequately consolidated, and does not get displaced. All undulations shall be loosened by hand picking, surplus aggregate removed from high spots and depressions filled with surplus and new aggregate and the surface compacted again.

When thoroughly consolidated, kankarmoorum and red bajri, freshly collected shall be spread over it in 12 mm layer and consolidated with hand roller or heavy iron rammers, with sufficient application of sufficient water till a uniform surface is obtained.

5.3.3 Measurement and Rate

The length and breadth shall be measured to the nearest centimetre. The depth of consolidated layer shall be computed to nearest half centimetre by taking average of depths at the centre. The consolidated cubical contents shall be calculated in cubic metres correct to two places of decimal

The rate shall include the cost of all labour and materials involved in all the operations described above including cost of stone aggregate, binding material, rolling, watering and consolidating.

5.4 Laying of Bituminous Courses

The laying of bituminous surface courses shall be as indicated below:

- For normal bituminous macadam roads: Open graded Pre-mix carpet shall be overlaid with seal coat.
- For Heavy duty bituminous roads: Single layer of Bituminous macadam of 50mm (With minimum bitumen content of 4%) shall be overlaid with open graded Pre-mix carpet and seal coat.

The bituminous courses shall be laid such, so as to match with the existing road profile.

5.5 Laying of Bituminous Macadam

5.5.1 Scope

The scope includes laying of bituminous macadam on consolidated water bound macadam surface. The

consolidated thickness of the layer shall be 50mm. The treatment shall include applying a tack coat on the prepared base followed immediately by spreading, laying and consolidating the layer with aggregates pre-coated with specified binder content (of 4%) to camber and consolidating the same. The bituminous macadam surface layer shall not be laid during rainy weather or when the base course is damp or wet or, when the atmospheric temperature in the shade is not more than 16°C.

5.5.2 Materials

Bitumen

Bitumen shall be paving bitumen of penetration Grade of specified consistency and content conforming to IS 73 or as otherwise specified in the item.

Coarse Aggregate

The coarse aggregates shall consist of crushed rock, crushed gravel or other hard material retained on the 2.36 mm IS Sieve. They shall be clean, hard, durable, or cubical shape, free from dust and soft or friable matter, organic or other deleterious substance. Before approval of the source, the aggregates shall be tested for stripping.

Where crushed gravel is proposed for use as aggregate, not less than 90% by weight of the crushed material retained on the 4.75 mm IS Sieve shall have at least two fractured faces.

Fine Aggregate

Fine aggregates shall consist of crushed or naturally occurring mineral material, or a combination of the two, passing the 2.36 mm IS Sieve and retained on the 75 micron sieve. They shall be clean, hard, durable, dry and free from dust and soft or friable matter, organic or other deleterious matter. The fine aggregate shall have a sand equivalent value of not less than 50 when tested in accordance with the requirements of IS 2720 (Part 37). The plasticity index of the fraction passing the 0.425 mm IS Sieve shall not exceed 4, when tested in accordance with IS 2720 (Part 5).

Aggregate grading and binds content aggregate grading, quantity of bitumen and appropriate thickness are as per table

5.5.3 Application of Tack Cost

Hot bitumen shall be applied evenly to the clean, dry surface by means of a pressure sprayer at specified rate. Even and uniform distribution of bitumen shall be ensured. Bitumen shall be applied longitudinally along the length of the pavement and never across it. Excessive deposits of bitumen caused by stopping or starting of the sprayer or through leakage or any other reason shall be suitably rectified. Bitumen shall be heated in a boiler to a temperature of 165 deg. C to 175 deg. C and maintained at that temperature. Temperature shall be checked at regular intervals with the help of a thermometer.

5.5.4 Spreading and compacting Bituminous macadam

Preparation, spreading and consolidating of bituminous macadam layer shall be as per MoRTH / IRC specifications.

5.5.5 Measurement and Rate

Bituminous Macadam shall be measured as furnished work in cubic meters correct to two places of decimal. The rate includes the cost of all material, labour and equipments including application of tack cost carrying out all the operations as per the technical requirements and to the satisfaction of the Engineer.

5.6 Laying of Pre-mix Carpet

5.6.1 Scope

The scope includes laying of pre-mix carpet on consolidated water bound macadam surface / bituminous macadam surface. The treatment shall include applying a tack coat on the prepared base followed immediately by spreading aggregates pre-coated with specified binder to camber and consolidated. Premix carpet shall not be laid during

rainy weather or when the base course is damp or wet or, when the atmospheric temperature in the shade is not more than 16°C.

5.6.2 Materials

Binder

The bitumen shall be paving bitumen of penetration Grade of specified consistency and content conforming to IS 73 or as otherwise specified in the item.

Coarse Aggregate

Coarse aggregate shall consist of angular frangments of clean, hard, tough and durable rock of uniform quality throughout. Coarse aggregates to be used shall confirm to IS:2386.

Gradation and Binder Quantity

The gradation of aggregates shall be shown below:

Nominal Size	Specification	Quantity	Binder Quantity
13.2 mm	100 per cent passing through IS sieve 22.4 mm square mesh and retained on IS Sieve 11.2 mm square mesh	1.5 cum/100 sqm	1.8 Kg / Sqm

Quantities of materials used shall be as shown below:

Consolidated thickness of pre-mix carpet	Binder Hot Bitumen	Stone Chippings (in Cum/100 sqm)	
		13.2 mm	11.2 mm
25mm	52 kg/cum of 13.2 mm size and 56 kg per cum of 11.2 mm	2.25 Cum	1.12 Cum

5.6.3 Surface Preparation

Prior to the application of bitumen, all loose sealing compound, caked mud, animal dung, dust, dirt and foreign material shall be removed from the entire surface of the pavement and from existing dummy, construction and expansion joints (wherever existing) by means of blowers and or with steel wire brushes, small picks, brooms or other implements as approved by the Engineer-in-Charge. The material so removed shall be disposed off as directed by the Engineer-in-Charge.

5.6.4 Application of Tack Coat

Hot bitumen shall be applied evenly to the clean, dry surface by means of a pressure sprayer at specified rate. Even and uniform distribution of bitumen shall be ensured. Bitumen shall be applied longitudinally along the length of the pavement and never across it. Excessive deposits of bitumen caused by stopping or starting of the sprayer or through leakage or any other reason shall be suitably rectified. Bitumen shall be heated in a boiler to a temperature of 165 deg. C to 175 deg. C and maintained at that temperature. Temperature shall be checked at regular intervals with the help of a thermometer.

5.6.5 Preparation of pre-mix including Laying and Rolling

The aggregate shall be dry and suitably heated to temperature as directed by Engineer-in-Charge before these are placed in the mixer to facilitate mixing with the binder. The binder shall be heated to the temperature appropriate

to the grade of bitumen approved by the Engineer-in-Charge, in boilers of suitable design avoiding local overheating and ensuring a continuous supply.

The aggregates shall be dry and suitably heated to a temperature as directed by Engineer-in-Charge before these are placed in the mixer. After about 15 seconds of dry mixing, the heated binder shall be distributed over the aggregates at the rate specified. The mixing of binder with chippings shall be continued until the chippings are thoroughly coated with the binder. The mix shall be immediately transported from the mixer to the point of use in suitable vehicles or wheel barrows. The vehicles employed for transport shall be cleaned and be covered over in transit if so directed.

The premixed material shall be spread on the road surface with rakes to the required thickness and camber or distributed evenly with the help of a drag spreader, without undue loss of time. The camber shall be checked by means of camber boards and inequalities evened out. As soon as sufficient length of bituminous material has been laid, rolling shall commence with 6 to 9 tonne power rollers, preferably of smooth wheel tandon type, or other approved plant. Rolling shall begin at the edges and progress towards the centre longitudinally. Except on the super elevated portions rolling shall progress from the lower to upper edge, parallel to the centre line of the pavement. The consolidated thickness shall not at any place be less than the specified thickness by more than 25%. However, the average thickness shall not be less 25mm.

When the roller has passed over the whole area once, any high spots or depressions which become apparent shall be corrected by removing or adding premixed materials. Rolling shall then be continued until the entire surface has been rolled to compaction and all the roller marks eliminated. In each pass of the roller, preceding track shall be overlapped uniformly by at least 1/3 width. The roller wheels shall be kept damp to prevent the premix from adhering to the wheels and being picked up. In no case shall fuel/lubricating oil be used for this purpose.

Alternative means of consolidation maybe considered when the width of the layer is insufficient for the roller to operate. The alternative means proposed by the contractor will be reviewed by the Engineer based on site specific conditions.

5.6.6 Measurement and Rate

The length and width of the finished work shall be measured correct to a cm along the finished surface of the road. The area shall be calculated in square metre, correct to two places of decimal. For record purposes, the measurement for binder and stone chippings shall be carried out before they are actually used on the work. Pre-measurements of the materials taken for record purposes shall simply serve as a guide and shall not form the basis for payment. The rate for premix carpet shall be cost of all materials, labour and equipment involved in all operations including application of tack coat to complete the job to the satisfaction of the Engineer.

5.7 Laying of Seal Coat

5.7.1 Scope of work

The works shall consist of the application of a wearing course for sealing the voids in a bituminous surface laid to the specified levels, grade, and cross fall (camber). The wearing course shall comprise of liquid seal coat comprising of an application of all layer of bituminous binder followed by a cover of stone chips.

5.7.2 Materials

Binder

The bitumen shall be paving bitumen of penetration Grade of specified consistency and content conforming to IS 73 or as otherwise specified in the item.

Coarse Aggregate

Coarse aggregate shall consist of angular frangments of clean, hard, tough and durable rock of uniform quality throughout. They should be free of soft or disintegrated stone, organic or other deleterious matter. Stone chips shall be of 6.7mm size defined as 100 per cent passing through 11.2 mm sieve and retained on 2.36 mm sieve.

The quantity used for spreading shall be 0.09 cubic metre per 100 square metre area. Coarse aggregates to be used shall confirm to IS: 2386.

Fine Aggregate

The aggregate shall be sand or grit and shall consist of clean, hard durable, uncoated dry particles and shall be free from dust, soft or flaky/elongated material, organic matter or other deleterious substances. The aggregate shall pass 2.36 mm sieve and be retained on 180 micron sieve. The quantity used for premixing shall be 0.06 cubic metres per 100 square metres area. Stones or fine aggregate shall be used as specified in item.

5.7.3 Laying of Seal Coat

Bitumen shall be heated to 150°C – 163°C and sprayed at the rate specified on the dry surface in a uniform manner with a self-propelled mechanical sprayer.

Immediately after the application of binder, stone chips which shall be clean and dry, shall be spread uniformly at the rate specified on the surface preferably by means of a self –propelled or towed mechanical grit spreader so as to cover the surface completely. If necessary, the surface shall be brushed to ensure uniform spread of chips.

Immediately after the application of the cover material, the entire surface shall be rolled with a 8-10 tonne smooth wheeled steel roller, 8-10 tonne static weight vibratory roller, or other equipment approved by the Engineer after laying trials if required. Rolling shall commence at the edges and progress towards the centre except in super-elevated and unidirectional cambered portions where it shall proceed from the lower edge to the higher edge. Each pass of the roller shall uniformly overlap not less than one-third of the track made in the proceeding pass. While rolling is in progress, additional chips shall be spread by hand in necessary quantities required to make up irregularities. Rolling shall continue until all aggregate particles are firmly embedded in the binder and present a uniform closed surface.

5.7.4 Measurement and Rate

Seal coat, for both items shall be measured as finished work over the area specified to be covered, in square metres at the thickness specified in the item. The rate for seal coat shall be cost of all materials, labour and equipment involved in all operations including application of tack coat to complete the job to the satisfaction of the Engineer.

Chapter 6 Quality Control for Pipeline Works

This section covers the testing of works and the inspection of workmanship for pipeline works (i.e. water and sewer lines) and liquid retaining structures.

6.1 General Requirements

The contractor shall execute all the Quality Control works and perform tests as per the direction the Engineer-in-charge. The Contractor's Quality control duties are summarized below. Other duties shall be performed as stipulated in the contract documents and or directed by the Engineer-in-charge.

Activity / Item	Contractor's Quality Control Duties
Laboratory Equipment at Site	– Intimate Engineer-in-charge the details, date of completion with requisite manufacturers' and calibration certificates – Maintain the equipment in good condition and calibrate as necessary
Material receipts	– Enter receipts in material register
Materials testing	– Prepare mix designs as required by contract and submit test results to Engineer-in-charge – Take test samples in presence of Engineer-in-charge when requested and submit test reports

Activity / Item	Contractor's Quality Control Duties
	– Perform materials tests – Maintain test log
Rejected materials	– Enter in material register at site – Intimate Engineer-in-charge in writing the proposed date of removal from site and confirm after removal
Material consumption	– Enter daily consumption of materials in material register and indicate balance quantity
Construction equipment	– Intimate Engineer-in-charge the details, date of mobilization along with requisite insurance certificate – Maintain equipment in good working condition
Construction	– Intimate Engineer-in-charge in writing when construction is going to commence and what activities are proposed to be undertaken. – Intimate Engineer-in-charge in advance when critical works, such as concreting, embankment, paving, pipeline laying and jointing, testing, etc., would be undertaken, along with the test certificates of the materials proposed to be used in these works. No critical activity shall start unless the material test certificates are verified and approved by the Engineer. – Provide necessary QA/QC measures
Daily work progress	– Maintain in daily log
Testing of works in progress	– Perform tests as per contract requirements – Submit test reports to Engineer-in-charge – Maintain test log
Rejected work items	– Intimate Engineer-in-charge in writing the proposed date of removal from site and confirm after removal. – Rectify defective work and offer for re-inspection.
Instructions from Engineer	– Enter change orders, site instructions, letters and minutes of meetings issued by the Engineer and Consultants in the Instruction Log
Inspection of Engineer	– Take instructions in Site Order Book.
Progress scheduling and control	– Prepare and maintain project schedules and undertake work in accordance with approved schedule

6.2 Inspection and Testing of Works

The works to be tested on site include bedding for pipelines, pipeline laying and jointing, and hydrostatic, leakage, water tightness tests after completion and other tests as called for in the technical specifications. All the materials proposed to be used in these works must have been tested by the Contractor and approved by the Engineer-in-charge.

The inspection of pipes, valves, flow-meters and related mechanical items shall be carried out by the Third Party Agency as desired by the Employer.

6.3 Site Order Book

The Contractor shall be responsible to maintain a Site Order Book, in duplicate, at the site of the works at all times, and this shall be open for inspection by the Engineer-in-charge

The Site Order Book has two primary purposes – to record the day-to-day instructions to the Contractor and the Contractor's compliance with these instructions, and to record the inspection and acceptance of work completion

stages along with issuing approvals to the Contractor to proceed with the next stage of construction.

1. Fixing the ball valve

Providing, Supply and installation of PVC/PP/Composit Ball Valves in PN1.6 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 WRAS UK/KIWA etc. suitable for food products & drinking water, female threads in accordance with ISO:7/BS:21/ IS: 554 and shall be inclusive of all cost such as testing, all taxes related to central, state & municipal, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.

2. Installation of the consumer meter

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.

3. Providing and fixing the protective box

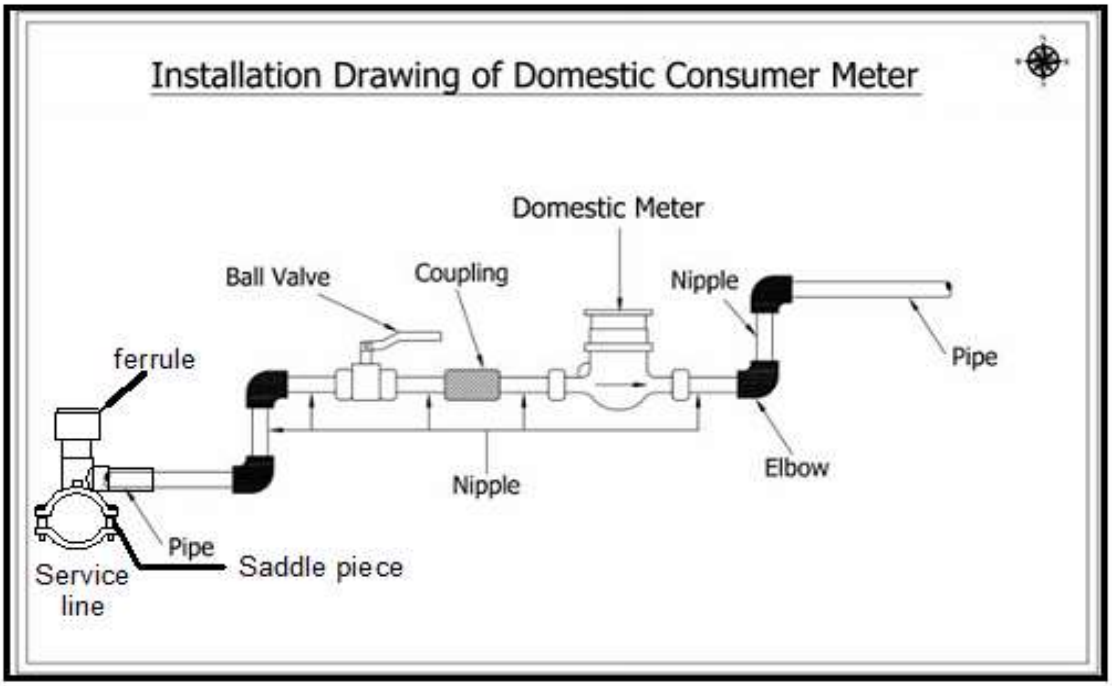
Weight shall not be less than 850 gms.

Load carrying capacity 15 Kg/ Cm2 Certificate of Testing along with consignment

- More than pedestrian load
- Unique lock and key arrangement shall be provided and least Metallic to be used to make it weather proof.
- Unique Pipe griping arrangement shall be provided to secure Water Meter Box in place.
- Unique flap shall be provided to avoid mud/ sludge/ reptiles to reside inside
- Can be mounted on wall as well as use on ground.

4. Testing and making water tight the complete system

After successful installation the complete system shall be checked for water tightness and any drops or leakage shall be rectified to the fullest satisfaction of the engineer in charge. The contractor shall take a signature of the person in whose house the connection has been installed, that the 1. Connection has no leakages in it 2. The site restoration work has been done satisfactorily 3. The ball valve is functioning properly. 4. The meter wheel is functioning properly 5. The contractor has performed the volume delivery test and the units in the meter are exactly matching with the volume of water 6.


Installation Drawing of Domestic Consumer Meter
Domestic Meter
Ball Valve
Coupling
Nipple
Pipe
ferrule
Nipple
Elbow
Pipe
Service line
Saddle piece

Annexure - 'F' : Price Schedule

ANNEXURE-'F-1"- BILL OF QUANTITY FOR DISTRIBUTION NETWORK-KHAMTARAI & GUDYARI AREA OF RAIPUR CITY

S.N.	PARTICULARS	REFERENCE	QTY	RATE	UNIT	AMOUNT	REMARKS
1	**Excavation:**						
	Earthwork in excavation for pipe trench in all kinds of soil in areas including dressing, watering and ramming and disposal of excavated earth lead up to 50m & lift up to 1.5, disposal earth to be levelled, neatly dressed for Both the Zones	(CG PHE SOR P.19 It. No. 2.1)					
	Dia.						
a)	400mm Dia. D.I K - 7		165.18				
b)	350mm Dia. D.I K - 7		543.35				
c)	300mm Dia. D.I K - 7		1241.55				
d)	250mm Dia. D.I K - 7		690.2				
e)	200mm Dia. D.I K - 7		1248.89				
f)	150 mm Dia. D.I K - 7		2980.39				
g)	100 mm Dia. D.I K - 7		23515.4				
			30,385		**Cum**		
2	Earth work in excavation for pipe trench in all kinds of soft rock in areas i/c dressing, watering and ramming and disposal of excavated earth lead up to 50 meters & lift up to 1.5m, disposal earth to be levelled, neatly dressed, , including dismantling of CC Road.	(CG PHE SOR P.19 It. No. 2.5a)					
	Dia.						
	Lift 0.00 to 1.50 M						
a)	400mm Dia. D.I K - 7		94.66				
b)	350mm Dia. D.I K -7		280.83				
c)	300mm Dia. D.I K - 7		571.95				
d)	250mm Dia. D.I K - 7		279.18				
e)	200mm Dia. D.I K - 7		435.01				
f)	150 mm Dia. D.I K-7		870.68				
g)	100 mm Dia. D.I K-7		5548.57				
			8,081		**Cum**		

S.N.	PARTICULARS	REFERENCE	QTY	RATE	UNIT	AMOUNT	REMARKS
3	Hard rock requiring chiselling/ blasting prohibited	[Item no.-2.5c in USOR-PHED, CG-Feb'2015, Page No. 19]					
			303.85		**Cum**		
4	Pumping out water caused by springs, tides or river seepage, broken water mains or drains.	(CG PHE SOR P.20 It. No. 2.9)	50000		**KL**		
5	Providing, laying and jointing socket & spigot centrifugally cast (Spun) Ductile Iron pressure pipes with inside cement mortar lining (class K-7) Conforming to IS 8329/2000 with suitable Rubber Gasket (Push on) joints as per IS:5382/85 including testing of joint (laying Conforming to IS 12288: 1987)	(CG PHE) USOR I.no. 6.50 Ammendment No.04/2015-16					
a)	400mm Dia. D.I K - 7		232		**Mtr**		
b)	350mm Dia. D.I K -7		814		**Mtr**		
c)	300mm Dia. D.I K - 7		1860		**Mtr**		
d)	250mm Dia. D.I K - 7		1034		**Mtr**		
e)	200mm Dia. D.I K - 7		1871		**Mtr**		
f)	150 mm Dia. D.I K-7		4465		**Mtr**		
g)	100 mm Dia. D.I K-7		35229		**Mtr**		
			45505				
6	Providing and supplying DI specials and fittings (push on /flanged pipes) for all types of specials, bends, tees etc.	(CG PHE SOR 2013 It. No. 6.49.1)					
	DI pipe Dia.						
	Above 350mm Dia.						
a)	400mm Dia. D.I K - 7		746.23				
b)	350mm Dia. D.I K -7		2188.03				
			2934.26		**kg**		
	Below 350mm Dia. Total Weight						
	80mm t0 300 mm Dia.						
c)	300mm Dia. D.I K - 7		4012.02				
d)	250mm Dia. D.I K - 7		1765.04				
e)	200mm Dia. D.I K - 7		2423.88				
f)	150 mm Dia. D.I K - 7		4369				

S.N.	PARTICULARS	REFERENCE	QTY	RATE	UNIT	AMOUNT	REMARKS
g)	100 mm Dia. D.I K - 7		23427.3				
			35997.2		**kg**		
7	Filling available excavated earth in trenches plinth sides of foundation in layers not exceeding 20cm. In depth including consolidation of each layer by ramming, watering, lead up to 50m & lift up to 1.5m in all kinds of soils (CG PHE SOR P.20 It. No. 2.10.1)	(CG PHE SOR It. No. 2.10.1)	28233.2		**Cum**		
8	Providing and Supplying 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, Central, State and Municipal taxes and duties inspection charges, transit insurance, loading/unloading FOR site unloading & stacking etc. complete as per direction of Engineer-in-Charge						
	ITEMS FOR ROAD CUTTING FOR NH & SH CROSSINGS						
	400 Dia. 10 mm for 200 pipe	(CG PHE) USOR I.no. 17.12.5 Ammendment No.04/2015-16	50		**Mtr**		
	300 Dia. 10 mm for 150 pipe	(CG PHE) USOR I.no. 17.12.3 Ammendment No.04/2015-16	50		**Mtr**		
9	Labour Only for lowering & laying of M.S. Pipes on pedestals or chairs upon prepared formation including all site arrangements complete.						
	ITEMS FOR ROAD CUTTING FOR CROSSINGS						
	400 Dia. 10 mm for 200 pipe	(CG PHE SOR P. 217 It. No. 17.8.2)	50		**Mtr**		
	300 Dia. 10 mm for 150 pipe		50		**Mtr**		
10	Welding in all position with required no. of runs for M.S pipes including gauging, fixing appurtenance and other accessories in connection with pipes laying work as per specification	(CG PHE SOR 2013 It. No. 17.10.1)					
	10 mm Lap Joint		21		**Mtr**		
	10% of Butt joint		2.1		**Mtr**		

S.N.	PARTICULARS	REFERENCE	QTY	RATE	UNIT	AMOUNT	REMARKS
11	Providing and laying mechanically mixed reinforced cement concrete of grade M-20 excluding cantering, shuttering and reinforcement in foundation, plinth and in superstructure.	(CG PHE SOR P.21 It. No. 2.22)	**12.7**		**Cum**		
12	Providing and placing in position cold twisted steel and hot rolled deformed steel reinforcement for RCC work I\C cutting, bending, binding etc. Complete I/C cost of binding wire and wastage	(CG PHE SOR P.21 It. No. 2.25.1)	260		**per Kg**		
13	Supply of DI D/F Sluice Valves / Scour Valve Slanted/Straight seated with metallic, corrosion proof and wear resistant seat faces, body and disc of ductile cast iron GGG 50/SG Iron 420/12 or equivalent grade as per IS:3896 (part-2) - 1985 and subsequent revisions. Shafts of stainless steel, shaft bearing of zinc free bronze and seat faces with nickel weld over lay, micro finished. All the inside and outside of the body is to be coated with double coating of Epoxy liquid. Drilled as per IS: 1538. PN-1.6	(CG PHE) USOR I.no. 8.3.7 Ammendment No.04/2015-16					
	300 mm		6		**No**		
	250 mm		2		**No**		
	200 mm		4		**No**		
	150 mm		9		**No**		
	100 mm		70		**No**		
14	Labour for laying & fixing of cast iron / DI valves including jointing & testing but without cost of jointing materials	[CG PHE SOR, Item no.-8.13, Page No. 126]					
	300 mm		6		**No**		
	250 mm		2		**No**		
	200 mm		4		**No**		
	150 mm		9		**No**		
	100 mm		70		**No**		
15	Construction of RCC valve chamber with RCC precast covers 300mm to 600mm Dia.	CG PHE SOR					Detail decription of items to be executed under this

S.N.	PARTICULARS	REFERENCE	QTY	RATE	UNIT	AMOUNT	REMARKS
							head ,Refer Annexure-F-1-B
			6		**each**		
16	Construction of RCC valve chamber with RCC precast covers 200mm to 300mm Dia.	CG PHE SOR					Detail decription of items to be executed under this head ,Refer Annexure-F-1-A
			6		**each**		
17	Providing & Fixing C.I. road box including loading, unloading and carting to site of work including all necessary excavation in all types of strata and fixing in murum packing, etc. complete.	(CG PHE SOR P.261 It. No. 23.12)					
	b) 225 mm x 300 mm (40kg)		79		**each**		
18	Chamfering ductile iron pipes of all types and classes to make suitable for tyton joints.	(CG PHE SOR P.325 It. No. 32.8)					
	100mm to150 mm Dia.		361		**Per End**		
	200 mm Dia.		17		**Per End**		
	250 mm Dia.		9		**Per End**		
	300 mm Dia.		17		**Per End**		
	350 mm Dia.		7		**Per End**		
	400 mm Dia.		2		**Per End**		
19	Providing and laying nominal mix plain cement concrete with crushed stone aggregate using concrete mixer in all works up to plinth level excluding cost of form work.	(CG PWD SOR Building 3.1.3/ P23)					
	1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40mm nominal size		3776.92		**Cum**		

S.N.	PARTICULARS	REFERENCE	QTY	RATE	UNIT	AMOUNT	REMARKS
20	Cement Concrete Pavement (Construction of un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub-base, coarse and fine aggregate conforming to IS:383, and graded as per table 600-3, mixed as per approved mix design at site, laid, spread, vibrated, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, de-bonding strip, dowel bar, tie rod, admixtures as approved, curing compound, finishing to lines and grades as per drawing as per clause 602.)	(CG PWD SOR Road 6.3.(ii)/ P26)					
	With Cement concrete grade M-30 and minimum cement content @ 375 kg/cum.		6043.06		**Cum**		
21	Providing & laying precast interlocking concrete blocks of minimum compressive strength of 300 kg/sq.cm and approved size , shape/ pattern over coarse sand bed of thickness up to 40 mm and joints thick filled with fine sand including levelling with surface vibrator, temping and sweeping etc. complete as per IRC-SP-63-2004	(CG PWD SOR /Road 4.15-B, Page No. 17)					
	B) 80mm thick Plain precast interlock concrete block		1500		**sqm**		
22	Disposing of surplus excavated stuff from site to suitable place for the lead of 5 KM	([Item no.-1.2e in CG PWD SOR/Road, Page No. 6)	10536.4		**Cum**		
23	Dismantling dead pipe line of M.S. /R.C.C. /D.I. /P.S.C. and G.I./ A.C./ P.V.C./ S.W./ H.D.P.E. pipe including cost of necessary excavation and refilling of trenches, breaking the joints, lifting the pipes and stacking to the place as directed by Engineer-in-charge with all leads and lifts including cleaning the surface etc. complete.	CG PHE SOR, ITEM NO.32.1.1-iv/ PAGE 323	4000		**Mtr**		

S.N.	PARTICULARS	REFERENCE	QTY	RATE	UNIT	AMOUNT	REMARKS
24	Electromagnetic Bulk Flow MetersSupply 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: 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, sum totalizer, Perfection category : IP 65Output : One current output (4-20 mA) one scalable pulse output with remote reading facility.	[CG PHE SOR-Item no.-30.5/ Page No. 309]					
	EMF meters For Distribution network for DMA						
	300 mm		9		**Each**		
	400 mm		2		**Each**		

ANNEXURE-'F-1- A- FOR ONE NO RCC VALVE CHAMBERS WITH RCC PRECAST COVERS FOR VALVES DIA. 200mm to 300 mm (SIZE 1.2 M. X 1.1 M. X 1.8 M.)

S. No.	Particulars	Reference	Unit		Qty.	Rate	Amount	Remarks
1	Earth work in excavation for pipe trench in all kinds of soil and WBM in areas including dressing, watering and ramming and disposal of excavated earth lead up to 1.5 m. disposal earth to be levelled, neatly dressed.	(CG PHE SOR P.19 It. No. 2.1)	Cum.		5.508			
2	Providing and laying mechanically mixed cement concrete 20mm nominal size graded crushed stone e/x cost of centring & shuttering.	(CG PHE SOR P.21 It. No. 2.21.1.1)	Cum.		0.612			
	In Plinth & foundation							
	M-10 (1:3:6)							
	PCC of valve chambers							
3	Providing and fixing formwork including centring shuttering, strutting, staging, propping bracing etc. complete & including removal of form work.	(CG PHE SOR P.25 It. No. 2.31.1 & 2.31.2)	Sqm.		4.32			
	i) Foundations, footing, base of columns and plinth beam in any shape and size up to plinth level.				5.76			
	Floor or valve chambers walls of any thickness.				3.96			
	ii) Walls of any thickness included attached buttresses.				5.4			
			Total		19.4			

S. No.	Particulars	Reference	Unit		Qty.	Rate	Amount	Remarks
4	Providing & laying mechanically mixed R.C.C. excluding cantering & shuttering and reinforcement in foundation/plinth (20mm graded metal) M-20	(CG PHE SOR P.21 It. No. 2.21.1.3)	Cum.		2.35			
5	Providing and placing in position cold twisted steel and hot rolled deformed steel reinforcement for R.C.C. work i/c cutting. Bending, binding etc. complete i/c cost of binding wire and wastage.	(CG PHE SOR P.23 It. No. 2.25.1.2	Kg.		235			

ANNEXURE-'F-1- B- FOR ONE NO RCC VALVE CHAMBERS WITH RCC PRECAST COVERS FOR VALVES DIA. 300mm to 600 mm (SIZE 1.8 M. X 1.8 M. X 2.2 M.)

S.No.	Particulars	Reference	Unit	Nos	Qty.	Rate	Amount
1	Earth work in excavation for pipe trench in all kinds of soil and WBM in areas including dressing, watering and ramming and disposal of excavated earth lead up to 1.5 m. disposal earth to be levelled, neatly dressed.	(CG PHE SOR P.19 It. No. 2.1)	Cum.		8.06		
2	Earth work in excavation for pipe trench in all kinds of rocks in areas including' dressing, stacking of useful material and disposal of unserviceable on up to 50 m. lead and lift up to	(CG PHE SOR P.19 It. No. 2.5)	Cum.		7		
	1.5 m.						
	a) Soft rock with or without blasting or bituminous pavement / cement concrete road.						
	2.56 x 2.56 x 1.07						
3	Providing and laying mechanically mixed cement concrete 20mm nominal size graded crushed stone e/x cost of centring & shuttering. In Plinth & foundation	(CG PHE SOR P.21 It. No. 2.21.1.1)	Cum.		0.57		
	M-10 (1:3:6)						
	PCC of valve chambers						
3	Providing and fixing formwork including centring shuttering, strutting, staging, propping bracing etc. complete & including removal of form work.	(CG PHE SOR P.25 It. No. 2.31.1 & 2.31.2)	Sqm.	2	1.18		
	i) Foundations, footing, base of columns and plinth beam in any shape and size up to plinth level.			2	19.36		

S.No.	Particulars	Reference	Unit	Nos	Qty.	Rate	Amount
	Floor or valve chambers walls of any thickness.			1	7.92		
	ii) Walls of any thickness included attached buttresses.			1	7.92		
				Total	35.2		
4	Providing & laying mechanically mixed R.C.C. excluding cantering & shuttering and reinforcement in foundation/plinth (20mm graded metal) M-20	(CG PHE SOR P.21 It. No. 2.21.1.3)	Cum.		4.49		
5	Providing and placing in position cold twisted steel and hot rolled deformed steel reinforcement for R.C.C. work i/c cutting. Bending, binding etc. complete i/c cost of binding wire and wastage.	(CG PHE SOR P.23 It. No. 2.25.1.2	Kg.		449		

Note:- Above mentioned quantities in ANNEXURE-'F-1- (A& B) are for providing 1 no VALVE CHAMBERS WITH RCC PRECAST. However bidder should calculate and quote for the required no. of connections as mentioned in Annexure-F-1, Item no. 15 & 16

ANNEXURE-'F-2"- BILL OF QUANTITY FOR FORHOUSE SERVICE CONNECTIONS -KHAMTARAI & GUDYARI AREA OF RAIPUR CITY

Sl. No.	Description	Quantity	Rate	Amount	Remarks
1	Providing, laying, installation and testing commissioning of House Service connections by Polyethylene- Aluminium- Polyethylene (PE-AL-PE) composite pressure pipes confirming to IS 15450-2004 UV with complete fitting by Clamp Saddle (DI Strap Saddle) and making good connection with proposed distribution pipe with ferrule (including excavation and refilling)				
	Property: 11293, Exist. Connections 3,264 (Shifting of 50% of Existing HSC-2832)				
	Diameter 15 mm	1621			Detail decription of items to be executed under this head ,Refer Annexure-F-2-A
	Diameter 20 mm	8			Detail decription of items to be executed under this head ,Refer Annexure-F-2-B
	Diameter 25 mm	3			Detail decription of items to be executed under this head ,Refer Annexure-F-2-C

Sl. No.	Description	Quantity	Rate	Amount	Remarks
2	Providing, laying, installation and testing commissioning of House Service connections by Polyethylene- Aluminium- Polyethylene (PE-AL-PE) composite pressure pipes confirming to IS 15450-2004 UV with complete fitting by Clamp Saddle (DI Strap Saddle) and ferrule (including excavation and refilling)				
	Property: 28047 (For New HSCs)				
	Diameter 15 mm	8022			Detail decription of items to be executed under this head ,Refer Annexure-F-2-A
	Diameter 20 mm	5			Detail decription of items to be executed under this head ,Refer Annexure-F-2-B
	Diameter 25 mm	2			Detail decription of items to be executed under this head ,Refer Annexure-F-2-C

Sl. No.	Description	Quantity	Rate	Amount	Remarks
3	Providing & Supply of PVC/PP Ball Valves in PN1.6 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 WRAS UK/KIWA etc. suitable for food products & drinking water, female threads in accordance with ISO:7/BS:21/ IS: 554 and shall be inclusive of all cost such as testing, all taxes related to central, state & municipal, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.				
	Property: 28047 (For existing HSCs)				
	(CG PHE SOR. P.NO.166, I.NO. 11.4)	9661			
4	Supply and Installation of Multi Jet, dry Dia. I, 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. (CG PHE SOR No.308 I. No. 30.1)				
	Diameter 15 mm	11264			
	Diameter 20 mm	21			
	Diameter 25 mm	8			

ANNEXURE-'F-2- A- FOR ONE NO. 15 MM DIA. HSC

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT	Remarks
	Item No.1:-					
	Excavation for pipe trenches in earth soils of all types sand, gravel and soft murum, including removing the excavated material up to 50m.and lift as below, stacking and spreading as directed, dewatering, shoring and strutting preparing the bed for the foundation excluding back filling etc. complete.	(CG. PHE SOR P.No.19 / It. No.2.1)				
1.075				Cum		
	For portion below CC road surface					
	1.0 x 1.0 x 0.85m					
	5.0 x 0.30 x 0.15m for connection pipe					
	Item No.2:-					
	Excavation for foundation / pipe trenches by all means in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material up to a distance of 50 M beyond area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete.	(CG. PHE SOR P.No.19 / It. No.2.5.A)				
0.875				Cum		
	For portion of CC road surface					
	1.0 x 1.0 x 0.35m					
	5.0 x 0.30 x 0.35m for connection pipe					
	Item No.3:-					
	Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main:	(CG PWD SOR 19.20.1 /P180)				
1				No.		
	Item No.4: -					

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT	Remarks
	Providing and fixing Polyethylene-Aluminium- Polyethylene (PE-AL-PE) composite pressure pipes confirming to IS 15450-2004 UV. Stabilised with carbon black having thermal stability for hot and cold-water supply, capable to withstand temperature up to 80^0 C including jointing & testing of joints as per the direction of the engineer in charge. External work.	(CG. PHE SOR P.NO.333, I.NO. 32.27)				
6				Rmt		
	6 m pipe for each connection					
	20 mm Dia. OD medium class pipe					
	Item No.5:-					
	Providing and supply of compression fittings, PN 1.6 rated in confirmation to ISO: 14236-2000 and shall be tested as per ISO 3459, ISO 3501 & ISO 3503, suitable for drinking water & approved by WRAS, UKI, KIWA etc. In food grade polypropylene and shall be inclusive of all cost such as testing, all taxes related to central state & municipal, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.	(CG. PHE SOR P.NO.165, I.NO. 11.3.1)				
4	1. Metal inserted compression male/ female threaded adapter with SS 304			Each		
	Item No.6:-					
	Providing & Supply of PVC/PP Ball Valves in PN1.6 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 WRAS UK/KIWA etc. suitable for food products & drinking water, female threads in accordance with ISO:7/BS:21/ IS: 554 and shall be inclusive of all cost such as testing, all taxes related to central, state & municipal, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.	(CG. PHE SOR P.NO.162, I.NO. 11.4)				
1				No.		
	Item No.8:-					

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT	Remarks
	Filling available excavated earth in trenches, lead up to 50m and lift up to 1.5m in all kind of soil excluding watering and ramming.	(CG. PHE SOR P.No.20 / It. No.2.10.2)				
1.075				Cum		
	Item No.10:-					
	Providing & Supply 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 elastomeric 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 up to 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 elastomeric seal matching to the curvature of the pipe. The seal shall be of elastomeric 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. Including fixing ferrule on the saddle and fixing the flow of water through the ferrule to the satisfaction of department.	(CG PHE SORNo.167I. No. 11.5)				
1	100 NB 1097			No.		

ANNEXURE-'F-2- B- FOR ONE NO. 20 MM DIA. HSC

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT
	Item No.1:-				
	Excavation for pipe trenches in earth soils of all types sand, gravel and soft murum, including removing the excavated material up to a distance of 50m.and lift as below, stacking and spreading as directed, dewatering, shoring and strutting preparing the bed for the foundation excluding back filling etc. complete.	(CG. PHE SOR P.No.19 / It. No.2.1)			
1.075				Cum	
	For portion below CC road surface				
	1.0 x 1.0 x 0.85m				
	5.0 x 0.30 x 0.15m for connection pipe				
	Item No.2:-				
	Excavation for foundation / pipe trenches by all means in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material up to a distance of 50 M beyond area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete.	(CG. PHE SOR P.No.19 / It. No.2.5.A)			
0.875				Cum	
	For portion of CC road surface				
	1.0 x 1.0 x 0.35m				
	5.0 x 0.30 x 0.35m for connection pipe				
	Item No.3:-				
	Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main :	(CG PWD SOR 19.20.2 /P180)			
1				NO.	
	Item No.4:-				
	Providing and fixing Polyethylene- Aluminium-Polyethylene (PE-AL-PE) composite pressure pipes confirming to IS 15450-2004 UV. Stabilised with carbon black having thermal stability for hot and cold water supply, capable to withstand temperature up to 80^0 C including jointing & testing of joints as per the direction of the engineer in charge. External work.	(CG. PHE SOR P.NO.333, I.NO. 32.27)			
6				Rmt	

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT
	6 m pipe for each connection				
	25 mm Dia. OD medium class pipe				
	Item No.5:-				
	Providing and supply of compression fittings, PN 1.6 rated in confirmation to ISO: 14236-2000 and shall be tested as per ISO 3459, ISO 3501 & ISO 3503, suitable for drinking water & approved by WRAS, UKI, KIWA etc. In food grade polypropylene and shall be inclusive of all cost such as testing, all taxes related to central state & municipal, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.	(CG. PHE SOR P.NO.165, I.NO. 11.3.1)			
4	1. Metal inserted compression male/ female threaded adapter with SS 304			Each	
	Item No.6:-				
	Providing & Supply of PVC/PP Ball Valves in PN1.6 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 WRAS UK/KIWA etc. suitable for food products & drinking water, female threads in accordance with ISO:7/BS:21/ IS: 554 and shall be inclusive of all cost such as testing, all taxes related to central, state & municipal, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.	(CG. PHE SOR P.NO.162, I.NO. 11.4)			
1				No.	
	Item No.7:-				
	Filling available excavated earth in trenches, lead up to 50m and lift up to 1.5m in all kind of soil excluding watering and ramming.	(CG. PHE SOR P.No.20 / It. No.2.10.2)			
1.075				Cum	
	Item No.08:-				

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT
	Providing & Supply 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 elastomeric coated (insulated) type for firm grip on pipe as well as to protect the coating on the pipe and to insulate the un-identical metals. The saddle shall be single strap type up to 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 elastomeric seal matching to the curvature of the pipe. The seal shall be of elastomeric 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 including fixing ferrule on the saddle and fixing the flow of water through the ferrule to the satisfaction of department.	(CG PHE SOR P No.167I. No. 11.5)			
1	150 NB			No.	

ANNEXURE-'F-2- C- FOR ONE NO. 25 MM DIA. HSC

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT
	Item No.1:-				
	Excavation for pipe trenches in earth soils of all types sand, gravel and soft murum, including removing the excavated material up to a distance of 50m.and lift as below, stacking and spreading as directed, dewatering, shoring and strutting preparing the bed for the foundation excluding back filling etc. complete.	(CG. PHE SOR P.No.19 / It. No.2.1)			
1.075				Cum	
	For portion below CC road surface				
	1.0 x 1.0 x 0.85m				
	5.0 x 0.30 x 0.15m for connection pipe				
	Item No.2:-				
	Excavation for foundation / pipe trenches by all means in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material up to a distance of 50 M beyond area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete.	(CG. PHE SOR P.No.19 / It. No.2.5.A)			
0.875				Cum	
	For portion of CC road surface				
	1.0 x 1.0 x 0.35m				
	5.0 x 0.30 x 0.35m for connection pipe				
	Item No.3:-				
	Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main :	(CG PWD SOR 19.20.3 /P180)			
1				No.	
	Item No.4:-				

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT
	Providing and fixing Polyethylene-Aluminium- Polyethylene (PE-AL-PE) composite pressure pipes confirming to IS 15450-2004 UV. Stabilised with carbon black having thermal stability for hot and cold water supply, capable to withstand temperature up to 80^0 C including jointing & testing of joints as per the direction of the engineer in charge. External work.	(CG. PHE SOR P.NO.333, I.NO. 32.27)			
6				Mtr	
	6 m pipe for each connection				
	32 mm Dia. OD medium class pipe				
	Item no.5				
	Providing and supply of compression fittings, PN 1.6 rated in confirmation to ISO: 14236-2000 and shall be tested as per ISO 3459, ISO 3501 & ISO 3503, suitable for drinking water & approved by WRAS, UKI, KIWA etc. In food grade polypropylene and shall be inclusive of all cost such as testing, all taxes related to central state & municipal, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.	(CG. PHE SOR P.NO.165, I.NO. 11.3.1)			
4	1. Metal inserted compression male/ female threaded adapter with SS 304				
	Item No.6:-				
	Providing & Supply of PVC/PP Ball Valves in PN1.6 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 WRAS UK/KIWA etc. suitable for food products & drinking water, female threads in accordance with ISO:7/BS:21/ IS: 554 and shall be inclusive of all cost such as testing, all taxes related to central, state & municipal, inspection charges, transportation up to site, transit insurance, loading, unloading, stacking etc. complete.	(CG. PHE SOR P.NO.162, I.NO. 11.4)			
1				No.	
	Item No.8:-				

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT
	Filling available excavated earth in trenches, lead up to 50m and lift up to 1.5m in all kind of soil excluding watering and ramming.	(CG. PHE SOR P.No.20 / It. No.2.10.2)			
1.075				Cum	
	Item No.09:-				
	Providing & Supply 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 elastomeric coated (insulated) type for firm grip on pipe as well as to protect the coating on the pipe and to insulate the un-identical metals. The saddle shall be single strap type up to 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 elastomeric seal matching to the curvature of the pipe. The seal shall be of elastomeric 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 including fixing ferrule on the saddle and fixing the flow of water through the ferrule to the satisfaction of department.	(CG PHE SOR P No.167I. No. 11.5)			
1	200 NB			No.	

Note:- Above mentioned quantities in ANNEXURE-'F-2- (A,B & C) are for providing 1 no. HSC. However bidder should calculate and quote for the required no. of connections as mentioned in Annexure-F-2, Item no. 1 & 2 (for 15mm.20mm & 25mm)

ANNEXURE-'F-3"- BILL OF QUANTITY FOR FOR SHIFTING OLD CONNECTION FROM OLD LINE TO NEW LINE -KHAMTARAI & GUDYARI AREA OF RAIPUR CITY(FOR 1632 NOS)

QUANTITY	ITEM OF WORK	REFERENCE	RATE	UNIT	AMOUNT
	Item No.1:-				
	Excavation for pipe trenches in earth soils of all types sand, gravel and soft murum, including removing the excavated material up to a distance of 50m.and lift as below, stacking and spreading as directed, dewatering, shoring and strutting preparing the bed for the foundation excluding back filling etc. complete.	(CG. PHE SOR P.No.19 / It. No.2.1)			
1142.4				Cum	
	For portion below CC road surface				
	1.0 x 1.0 x 0.70m				
	Item No.2:-				
	Excavation for foundation / pipe trenches by all means in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material up to a distance of 50 M beyond area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete.	(CG. PHE SOR P.No.19 / It. No.2.5.A)			
816				Cum	
	For portion of CC road surface				
	1.0 x 1.0 x 0.50m				
	Item No.3:-				
	Pumping out water caused by springs, tides or river seepage, broken water mains or drains or well or the like.	(CG. PHE SOR P.NO. I. 20, NO. 2.9)			
816				Per KL	
	Item No.4:-				
	Filling available excavated earth in trenches, lead up to 50m and lift up to 1.5m in all kind of soil excluding watering and ramming.	(CG. PHE SOR P.No.20 / It. No.2.10.2)			
1958.4				Cum	

NON SOR ITEMS

ANNEXURE-'F-4"- BILL OF QUANTITY FOR FOR DISTRIBUTION NETWORK -KHAMTARAI & GUDYARI AREA OF RAIPUR CITY

S.N.	PARTICULARS	REFERENCE	QTY	RATE	Unit	AMOUNT
1	Provision of MS Specials for DI pipes (Making good connection with existing pipe and proposed pipe or vice versa)6%	NON SOR	2335.89		kg	
2	Provision of Making cross connection to existing distribution main of any type including excavation, breaking and removing exiting pipes, lowering, laying of specials and pipes in their position, refilling, closing the water supply in that area, dewatering and restarting the water supply, etc. complete as directed by Engineer-in-charge for following Diameters of existing pipeline, irrespective of Diameter of branch line (The item is excluding the cost of pipe, fittings, valves etc. which shall be paid as per the relevant item).	NON SOR				
	100 mm		30		No.	
	150 mm		20		No.	
	200/225 mm		15		No.	
	250 mm		10		No.	
	300 mm		7		No.	
	350 mm		7		No.	
	400 mm		7		No.	
3	Provision for Dismantling of Existing AC/CI/GI pipes & CIDF Sluice Valve in existing pipe lines, repairing the valves thus dismantled, with damaged spindle restoration as directed by Engineer-in- charge, new gland fixing, and fixing the valves at a position directed by Engineer -in- charge with all specials such as CI Adapters wherever required to be used lines in distribution network.	NON SOR	1		JOB	
4	Providing and fixing MS meter box of required size to accommodate the water meter with opening and locking arrangement etc complete.	NON SOR	11293		No.	

NOTE: The rates against NON SOR items in above tables are fixed and percentage above/below SOR shall not be applicable on NON SOR items of works.

Annexure - 'G' : Guarantee Bond

ANNEXURE- 'G-I': GUARANTEE BOND

(To be used by approved scheduled banks)

1. In consideration of RAIPUR SMART CITY LIMITEDRaipur (here in after called the Corporation) having agreed to exempt..... .... (herein after called the said contractor(s) from the demand under the terms and conditions of an agreement dated ..... made between .....and RAIPUR SMART CITY LIMITED for the work of.....(here after chatted the said Agreement)

Indicate name of work) notified vide N.I.T. N..... Dated .....issued bythe Executive Engineer. RAIPUR SMART CITY LIMITED. Raipur (herein after called the said Agreement) of earnest money deposited for the due ful[4]ilment, by the said contractor(s) of the terms and conditions contained in the said agreement on production of a Bank Guarantee for Rs . ..... (Rupees .....

....only.)We to the as

'The Bank' at the request of the said contractor(s) do hereby undertake to pay the RAIPUR SMART CITY LIMITED(an amount not exceeding Rs ..... against any loss or damage caused to or suffered or would be caused to or suffered by the RAIPUR SMART CITY LIMITED by the reason of any breach by the said contractor (s) of the terms or condition contained in the said agreement.

2. We .....(`) .....

Bank Ltd.. do hereby under -take to pay the amounts due and payable under this guarantee without any demur merely on a demand from the RAIPUR SMART CITY LIMITED stating that the amount claimed is due by way of loss or damage caused to or suffered by the RAIPUR SMART CITY LIMITED by reason of any breach by said contractor {s) of any of the terms or conditions contained in the said agreement or by reason of the contractor (s) failure to perform the said agreement. Any such demand made on the Bank shall be conclusive, as regards the amount due and -payable by the bank under this guarantee However, our liability this guarantee shall be restricted to an amount not exceedingRs.....

3. We .....Bank limited further agree with the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that if shall continue to be enforceable till all dues of corporation under or by virtue of said agreement have been fully paid and its claims satisfied or till .. .. department ..... certifies that the terms of the said agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges the guarantee unless a demand or claim under this guarantee is made on us in writing on or before the ..... we shall be discharged from all Liability under this guarantee thereafter,

4. We .....(*)..... ..... Further agree that the guarantee herein contained shall remain in lull *force* and affect during the period that would be taken for the performance of the said agreement and that shall continue to be enforceable till all the dues of the RAIPUR SMART CITY LIMITED under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till the Executive Engineer, RAIPUR SMART CITY LIMITED certify that the terms and conditions of the said

agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the ....(*w).... ..... we shall be discharged from all liability under this guarantee.

5. We.....(``).....
.... further agree with the RAIPUR SMART CITY LIMITED that RAIPUR SMART CITY LIMITED shall be The fullest liberty without effecting in any manner our obligation hereunder to vary any of the terms and conditions or the said agreement to extend time of performance by ....

*(indicate name of the bank)

**Here write a date beyond 9 months of the prescribed date of opening of tenders,

The said contractor(s) from time to Time or to postpone for any time or for time to time, any of the power exercisable by the Government against the said contractor(s) and to forebear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor(s) or any

Forbearance act or commission on the part of the RAIPUR SMART CITY LIMITED or any indulgence by the MANAGING DIRECTORRAIPUR SMART CITY LIMITED to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties, would but for this provision have effect of so relieving us.

6 . This guarantee which not be discharged due to the change in the Constitution of the Bank or the an tractors)

7. We.....(*) Bank Limited, lastly undertake not to revoke thisguarantee it currency except with The previous consent of the RAIPUR SMART CITY LIMITED, in writing dated .....day of .....
or..... (indicate the name of the Bank) indicate The name of the Bank

ANNEXURE- 'G-II': (Revised form of Bank Guarantee Bond)

GUARANTEE BOND (in lieu of Security Deposit)

(To be used by approved scheduled Bank)

1. In consideration of RaipurRAIPUR SMART CITY LIMITED (here in after called the Government) having agreed to exempt..... (herein after ailed the said contractors) from the demand under the terms and conditions of an agreement dated .....made between ..... for the work (Name of work) ..... (Herein after called the said Agreement) of security deposit for' the due fulfillment by the said contractors) of the Terms and conditions in The said agreement On production of a Bank Guarantee for Rs .....Rupees.....only..... ..... (*) .....(herein after referred to as 'The Bank' (at the request of the said contractors) do here by undertakes to pay to The RAIPUR SMART CITY LIMITED and a amount not exceeding Rs .....against any loss or damage caused to or suffered or would be caused to or suffered by the RAIPUR SMART CITY LIMITED, by reason of any breach by the said contractor (s) of the terms or conditions contained in the said agreement in cache said contractor and the Government for the work of .... (indicate name of work) notified vide N.I.T. No..... Dated ..... issued by the Executive Engineer, RAIPUR SMART CITY LIMITED, Raipur (herein after called the said Agreement) of earnest money for the due fulfillment by the said contractor (s) of the germs and condition.

2. We (*) ..... do hereby undertake to pay the amounts due and payable under this guarantee without any demur merely on a demand from The RAIPUR SMART CITY LIMITEDstating that the amount claimed is due by way of loss or damage caused to or suffered by The RAIPUR SMART CITY LIMITED by reason of any breach by said contractor(s) of any of the terms or conditions contained in is said agreement or by reason or The contractor(s) failure to perform the said agreement. Any such remand made on the Bank shall be conclusive as regards the amount due and payable by the bank under is guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs.....

3. We undertake to pay To the RAIPUR SMART CITY LIMITED any money so demanded not withstanding any dispute or disputes raised by the contractor(s) in any suit or proceedings pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal.

4. We (*) ..... further agree That the guarantee herein contained shall remain in full force and effect during the period That would be taken for the performance of ne said agreement and That is shall continue to be enforceable till all the dues of the RAIPUR SMART CITY LIMITED under or by virtue of the said agreement have been fully paid and its chums satisfied or :is charged or till the Executive Engineer, RAIPUR SMART CITY LIMITED, Raipur certified That the terms and conditions of the said agreement have been fully and properly carried out by the said contractor(s) and accordingly discharged this guarantee. Unless a demand or claim under this guarantee Is made or 1JtR in writing on or before The ..... (here indicated a date which*%M falls 9 months beyond the due date of completion of the work) .....we shall be discharged from all liability under this guarantee.

5. Me (*) ..... further agree with the RAIPUR SMART CITY LIMITED shall have that fullest liberty without our consent and with effecting in any y manner our obligations here under to vary any of the terms and conditions of the said agreement to extend, try e of performance by the said contractors) from time to time or to postpone for any of the powers exercise able by the RAIPUR SMART CITY LIMITED against the said contractors) and to forebear or enforce any of the, terms and conditions relating to the said agreement and we shall not be relieved from our liability by reasons of any such variations, or extension being granted to the said contractor(s) or forbearance, actor commission on the part or the RAIPUR SMART CITY LIMITED or any indulgence by The RAIPUR SMART CITY LIMITED to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties

would, but for this provision have effect of so relieving us.

6. This guarantee will not be discharged due to, the change in the Constitution of the Bank or the contractor(s)

7. We (*) ..... lastly undertake not to revoke this guarantee it currency except with the previous consent of the RAIPUR SMART CITY LIMITED, in writing

Dated the ..... Day of .....

For (*)

(*) In indicate the name of the Bank

.....
.....

Annexure - 'H' : Special Conditions of NIT

(Reference Clause 8 of NIT)

(1) 'Additional performance security (APS) shall be deposited by the successful bidder at the time of signing of agreement when the bid amount is seriously unbalanced i.e. less than the estimated cost by more than 10% in such an event the successful bidder will deposit the Additional performance security (APS) to the extent of difference of 90 % of the PAC and bid amount in the shape of FDR, in favor of the MANAGING DIRECTOR before signing the agreement. The same shall be refunded along with the normal S.D. after completion of the work. If the contractor fails to complete the work or left the work incomplete, & the additional performance security (APS), Shall be forfeited by the department, & the agreement shall be terminated and action shall be taken in accordance with Clause 3 of the agreement. In case the tendered/contractor refuses to deposit Additional performance security (APS) then his bid will be rejected by the sanctioning authority and earnest money shall be forfeited'

(2) If the tendered, whose tender has been accepted, and after signing the agreement, (i) does not start regular actual physical items of work within 25% (twenty five percent) of the time allowed for completion, or abnormally slowdown the work or (iii) abandons the work, or (iv) merely goes on applying for extension or time, the Executive Engineer shall serve a 'show cause' notice with details to the contractor in this regard and if the contractor dose not reply, or if his reply is considered not satisfactory (at the sole discretion of the Executive Engineer), his earnest money and the performance security money or the Bank Guarantee in this regard shall be forfeited in favors of the RSCL. if the contractor has committed a similar default on earlier occasion (s) in previous three consecutive years the contractor shall be debarred from participating in any future tender of RSCLRaipur for a period of 2 (two) years from the date of such order, by the authority which had registered him/her.

Such orders & action shall be final binding and conclusive.

(3) Detailed Work Program

(i) Within 15 days of issue of order to start work, the contractor shall submit in the prescribed Performa a detailed construction programme month wise mentioning start and completion or each item/event involved in the due performance of the contract for contract more than 10 Crores Contractor shall also submit detailed programmer month wise for:

(a) Materials procurement

(b) Their transport arrangement to work site with details of No. of truck/tippers

(c) Detailing of construction plants &equipments

(d) Cash flow/revised Cash flow

(ii) The contractor shall submit in the first week of each month a statement of '**Monthly Target vis-à-vis Actual performance**' of each item/event with slippage, if any mentioning reasons of slippage and proposal for revised construction programmer to complete the same in targeted date or validly extended date. Failure to submit this monthly statement for 4 (Four) months can be treated as 'Fundamental Breach of Contract' and can result in invoking clause 3 of the conditions of contract.

If Contractor fails to submit Bank Guarantee of 5% amount of the gross bill, then 5% amount of bill shall be deducted from his running and final bill payment. However, the Contractor can get refund of such performance cash security amount deducted if he submits appropriate bank guarantee valid for the period as stated above or 24 (Twenty Four) months (as the case may be) after actual completion.

If required, the Executive Engineer shall ask the contractor to extend the validity period of the bank guarantee (s) for such period which be consider it proper and the contractor shall extend the validity period of such bank guarantee accordingly. If the contractor fails to extend the period accordingly, the Executive Engineer shall encase the Bank Guarantee before the expiry of the validity period.

(iii) The contractor shall have to carry out all necessary ' Rectification' of defects noticed, caused due to any reasons at his own cost within such reasonable period mentioned in such communication notice from the Executive engineer to him.

(iv) Failure of the contractor to rectify the defects properly in the given period, it shall be open for the Executive Engineer to get the defect (s) rectified either departmentally or through other agency (without calling any tender/quotation) and recover the actual cost plus 15% (Fifteen Percent) of such cost from the contactor from any sum, in any form, and available with the department or can be recovered as 'Arrears of Land Revenue'.

(iv), (v) Deleted in case form date of completion of work (one year)

(v) After two years of completion of construction, 50% (Fifty Percent) of available performance Bank Guarantee shall be returned to the contractor subject to the satisfaction of the Executive Engineer.

(vi) Remaining performance Bank Guarantee as would be remaining (after recovery all cost plus 15% (Fifteen percent) shall be returned after 3 years of completion.

The performance guarantee will be in addition to the normal security to be deducted as per clause 1 of agreement for the execution of contract.

(4) The tendered/contractor shall give in advance authority letter (s) in favour of the MANAGING DIRECTOR authorizing him to get all bank's fixed deposit receipts, Bank Guarantees (either normal security deposit and or for performance security) to get these bank receipts and guarantee deeds verified and got confirmed from the concerned bank. It will be only after getting such confirmation that the Executive Engineer shall pay any amount accordingly or refund the equal amount for which BG submitted has been duly verified and confirmed.

(5) The contractor shall not remove minor mineral form borrow areas, quarries without prior payment of Royalty charges.

(6) The PDMC deployed by the Engineer-in-charge shall act as the representative of the Engineer-in-charge to the Contract. Unless specificedothwerwise, the PDMC shall be involved in testing of materials, supervision of works to ensure quality as per required (IS / Technical specifications) standards. Contractor shall provide support and assistance in all field works, checking of measurements, bills, work done (temporary / permanent) in the field, incluiding all works to be carried out by the Engineer-in-charge. However, written approval of designs, drawings, additions,alterations, omissions, substitutions, approval for non-schedule items / rates as required shall be obtained from competent Authority of RSCL / UADD.

(7) Third Party Inspection including review and monitoring of the Project by IRMA as engaged by SUDA C.G. will be carried out including all works executed by contractor for which all facilities & accesses to all sites of work & necessary documents of project will be provided by the contractor at no extra cost.

(8) Typical formats for submission of Work Programme, Monthly Target Vs Actual Acheivement and Cash flow is presented below for reference:

WORK PROGRAMME

Name of Work. ……	Name of Contractor……..
Date of Work Order……	Due Date of Completion……
Detail Work Programme – Original / 1st Rev. / 2nd Rev.	d Date of Completion…….

Work Items

Sl. No.	**Items**	**Unit**	**Months**							
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1										
2										
3										
4										

Approved…….. Executive Engineer…….. Signature…….

MONTHLY TARGET Vs ACTUAL ACHEVEMENT

Cumulative Achievement of item of work for the month ending of ……

Agreement No. ……	Name of Work……..
Date of Work Order……	f Completion……..

Sl. No.	**Items**	**Cumulative Work Programmer**			**Cumulative Achievement actual**	**Slippage if any (Period)**	**Reason for slippage (Use add sheet if needed)**
		As per Original	**1st Revision**	**Last No. Revision**			
1	2	3 (a)	3 (b)	3 C	4	5	6

Comments of Executive Engineer if any

Cash Flow for performing the contract (applicable for works cost)

Name of Corporation……	Name of Contractor……..
Period of Contract…….	

(A)	Investment	1st Month	2nd Month	3rd Month	4th Month	5th Month	6th Month
(I)	Initial (E.M.) P.G. Insurance (Establish Site Office)						
(II)	Advance for Procurement of Material (if any)						
(III)	Advance for Procurement of labour (if any)						
(IV)	Purchase of New Equipment (if any)						
(V)	Other overheads staff including head office						
(VI)	Other if any (Furnish details)						
(x) Total Investment							
(B)	**Receipt**						
(I)	Gross Bill Amount						
	Deductions.						
a	S.D.						
b	Advance						
c	TDS						
d	Other recoveries if any						
(y) Total Receipt							
Net cash flow (x-y)							

NOTE:

(1) This should co-relate to work programmed/progress of work during the month.
(2) Running bill will be expected to be paid within 15 days of the receipt and checking of measurement, quality and quality of items
(3) Investment less net receipt for 1st 15 days and then during
(4) Final bills are expected to be paid within 2 months of satisfactory completion work.
(5) Total investment less Total Receipt (-) be shown in bracket.

ANNEXURE-I

Information & Instructions to the Bidders for Online Electronic Government Procurement System (e-GPS)

Guidelines for bidders on using IntegratedeProcurement System Govt. of Chhattisgarh. https://eproc.cgstate.gov.in

Note: These conditions will over-rule the conditions stated in the tender document(s), wherever relevant and applicable.

1. Vendor / Bidder Registration on the e-Procurement System:

All the Users / Bidders (Manufacturers / Contractors / Suppliers / Vendors / Distributors etc.) registered with and intending to participate in the Tenders of various Govt. Departments / Agencies / Corporations / Boards / Undertakings under Govt. of Chhattisgarh processed using the Integrated e-Procurement System are required to get registered on the centralized portal https://eproc.cgstate.gov.inand get approval on specific class (e.g. A, B, C, D, UGE, UDE) from Public Works Department (in case to participate in tenders restricted to vendors / bidders in a particular class).

The non – registered users / bidders who are also eligible to participate in the tenders floated using the e-Procurement system are also required to be registered online on the e-Procurement system.

Vendors are advised to complete their online enrolment / registration process on the portal well in advance to avoid last minute hassle, it is suggested to complete enrolment at least four days before the last date of bid submission date, failing which may result in non-submission of bids on time for which vendor/end user shall be solely responsible.

For more details, please get in touch with e-Procurement system integrator, M/s. Mjunction Services Limited, Raipur – 492 001 on Toll free 1800 258 2502 or email helpdesk.eproc@cgswan.gov.in.

2. Digital Certificates:

The bids submitted online must be signed digitally with a valid Class II / Class – III Digital Signature Certificate to establish the identity of the bidders submitting the bids online. The bidders may obtain pair of Encryption & Signing Class – II / Class – III Digital Certificate issued by an approved Certifying Authority (CA) authorized by the Controller of Certifying Authorities (CCA), Government of India.

Note: It may take upto 7 to 10 working days for issuance of Class-II / Class-III DigitalCertificate, Therefore the bidders are advised to obtain it at the earliest. It is compulsory to possess a valid Class-II / Class-III Digital Certificate while registering online on the above mentioned e-Procurement portal. A Digital Certificate once mapped to an account / registration cannot be remapped with any other account / registration however it may be inactivated / deactivated.

Important Note: bid under preparation / creation for a particular tender may only besubmitted using the same digital certificate that is used for encryption to encrypt the

bid data during the bid preparation / creation / responding stage. However bidder may prepare / create and submit a fresh bid using his/her another / reissued / renewed Digital Certificate only within the stipulated date and time as specified in the tender.

In case, during the process of a particular bid preparation / responding for a tender, the bidder loses his/her Digital Certificate because of any reason they may not be able to submit the same bid under preparation online, Hence the bidders are advised to keep their Digital Certificates secure to be used whenever required and comply with IT Act 2000 & its amendments and CVC guidelines.

The digital certificate issued to the authorized user of an individual / partnership firm / private limited company / public limited company / joint venture and used for online bidding will be considered as equivalent to a no-objection certificate / power of attorney to the user.

Unless the certificate is revoked, it will be assumed to represent adequate authority of the specific individual to bid on behalf of the organization / firm for online tenders as per Information Technology Act 2000. This authorized user will be required to obtain a valid Class-II / Class-III Digital Certificate. The Digital Signature executed through the use of Digital Certificate of this authorized user will be binding on the organization / firm. It shall be the responsibility of management / partners of the concerned organization / firm to inform the Certifying Authority, if the authorized user changes, and apply for a fresh digital certificate for the new authorized user.

3. Online Payment: As the bid is to be submitted only online, bidders are required tomake online payment(s) of the Registration fee / Transaction or Service fees / EMD using the online payments gateway services integrated into the e-Procurement system using various payment modes like Credit Card / Debit Card / Internet Takiyang / Cash Card / NEFT / RTGS etc.

For the list of available online modes of electronic payments that are presently accepted on the online payments gateway services, please refer the link '**Paymentsaccepted online**' on theeProcurement portal**https://eproc.cgstate.gov.in.**

4. Setup of User's Computer System: In order to operate on the e-Procurementsystem for a bidder / user, the computer system / desktop / laptop of the bidder is required to have Java ver. 765 , Internet explorer 9 / 11, latest Mozilafirefox with IE Tab V2 (Enhanced IE Tab) or any other latest browser. A detailed step by step document on the same is available on the home page. Also internet connectivity should be minimum one MBPS.

5. Publishing of N.I.T.: For the tenders processed using the e-Procurement system,only a brief advertisement notice related to the tender shall be published in the newspapers and the detailed notice shall be published only on the e-Procurement system. Bidders can view the detailed notice, tender document and the activity time schedule for all the tenders processed using the e-Procurement system on the portal **https://eproc.cgstate.gov.in.**

6. Tender's Critical Dates & Time/Tender Time Schedule: The bidders are strictlyadvised to follow the tender time for their side for tasks / activities and responsibilities to participate in the tender, as all the activities / tasks of each tender are locked before the start time & date and after the end time & date for the relevant activity of the tender as set by the concerned department official.

7. Download Tender Document(s): The tender document and supportingdocument(s) if any can be downloaded only online. The tender document(s) will be available for download to concerned bidders after online publishing of the tender and up to the stipulated date & time as set in the tender.

8. Submit Online Bids: bidders have to submit their bid online after successful fillingof forms within the specified date and time as set in the tender.
The encrypted bid data of only those bidders who have submitted their bids within the stipulated date & time will be accepted by the e-Procurement system. It is expected that the bidder complete his bid ad submit within timeline, a bidder who has not submitted his bid within the stipulated date & time will not be available during opening.

Bid documents uploading during bid preparation should be less than five MB (for individual document) and over all bid documents should be less than fifty MB.

9. Submission of Earnest Money Deposit: The bidders shall submit their EarnestMoney Deposit Either as in usual physically sealed Earnest Money Deposit Envelopee and the same should reach the concerned office OR Online using payment gateway as stated in the Notice Inviting Tender/ Tender document. Bidders also have to upload scanned copy of Earnest Money Deposit instrument OR Online Payment /NEFT/RTGS receipt along with the reference details online.

10. Opening of Tenders: The concerned department official receiving the tenders orhis duly authorized officer shall first open the online Earnest Money Deposit Envelopee of all the bidders and verify the same uploaded by the bidders. He / She shall check for the validity of Earnest Money Deposit as required. He / She shall also verify the scanned documents uploaded by the bidders, if any, as required. In case, the requirements are incomplete, the next i.e. technical and commercial Envelopees of the concerned bidders received online shall not be opened.

The concerned official shall then open the other subsequent Envelopees submitted online by the bidders in the presence of the bidders or their authorized representatives who choose to be present in the bid opening process or may view opened details online.

11. Briefcase: Bidders are privileged to have an online briefcase to keep theirdocuments online and the same can be attached to multiple tenders while responding, this will facilitate bidders to upload their documents once in the briefcase and attach the same document to multiple bids submitting.

For any further queries / assistance, bidders may contact:

1. The Service Integrator of e-Procurement system, M/s. Mjunction Service Ltd. on Help Desk Toll free No. 1800 258 2502 or email helpdesk.eproc@cgswan.gov.in.
2. Mr.Shailesh Kumar Soni, Sr. Manager, Chhattisgarh Infotech& Biotech Promotion Society (CHiPS) on Tel. No. 0771 - 4014158 or email: pro-chips@nic.in.

Annexure - 'J' : Pre contract Integrity Pact

1. GENERAL

1.1 This pre-bid contract Agreement (herein after called the Integrity Pact) is made on…….day of the month……20…….between, the RSCL acting through Shri……..(Designation of the officer , Department) RSCL (hereinafter called the 'BUYER' which expression shall mean and include, unless the context otherwise requires, his successors in the office and assigns) and the First Party , proposes to procure (name of the Stores / Equipment /Work/Service) and M/s ……represented by Shri ……Chief Executive Officer (hereinafter called the 'BIDDER/Seller' which expression shall mean and include , unless the context otherwise requires, his successors an permitted assigns) and the Second Party, Is willing to offer/has offered.

1.2 WHEREAS the BIDDER is a Private Company/Public Company/Government Undertaking/ Partnership/ Registered Export Agency, constituted in accordance with the relevant law in the matter and the BUYER is a Ministry/Department of the Government, performing its function on behalf of the RSCL.

2. OBJECTIVES

NOW , THEREFORE the BUYER and the BIDDER agree to enter into this pre-contract agreement , hereinafter referred to as Integrity Pact, to avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to during and subsequent to the Contract to be entered into with a view to :-

2.1 Enabling the BUYER to obtain the desired Stores/Equipment /Work/Service at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

2.2 Enabling BIDDERs to abstain from bribing or indulging in any corrupt practices in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing any corrupt practices and the BUYER will commit to prevent corruption, in any form, by its official by following transparent procedures.

3. COMMITMENTS OF THE BUYER

The BUYER commits itself to the following :-

3.1 The BUYER undertakes that no official of the BUYER, connected directly or indirectly with the contract, will demand, take promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favors or any material or immaterial benefit or any other advantage from the BIDDER, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the contract.

3.2 The BUYER will, during the pre-contract stage, treat BIDDERs alike, and will provide to all BIDDERs the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular BIDDER in comparison to the other BIDDERs.

3.3 All the officials of the BUYER will report the appropriate RSCL office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.

In case any such preceding misconduct on the part of such official(s) is reported by the BIDDER to the BUYER with the full and verifiable facts and the same *prima facie found* to be correct by the BUYER, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the BUYER and such a person shall be debarred from further dealings related to the contract process. In such a case while an enquiry is being conducted by the BUYER the proceedings under the contact would not be stalled.

4. COMMITMENTS OF BIDDERS

The BIDDER commits itself to take all measures necessary to prevent corrupt practices, un fair means an illegal activities during any stage of its bid or during any pre-contract or post- contract stage in order to secure the contract or in furtherance to secure it and in particular commit itself to the following :-

4.1 The BIDDER will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour any

material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BUYER, connected directly or indirectly with the biding process, or the any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.

4.2 The BIDDER further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour , any material or immaterial benefit or other advantage, commission, fees, brokerage, or inducement to any official of the BUYER or otherwise in procuring the Contract of forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other contract with the RSCL for showing or forbearing to show favour or disfavor to any person in relation to the contract or any other contract with the Government.

4.3 The BIDDER further confirms and declares to the BUYER that the BIDDER in the original Manufacture/Integrator/Authorized RSCL sponsored export entity of the stores and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the BUYER or any of its functionaries, whether officially or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

4.4 The BIDDER, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payment he has made, is committed to or intends to make to officials of the BUYER or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

4.5 The BIDDER will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation , contracting and implementation of the contract.

4.6 The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

4.7 The BIDDER shall not use improperly, for purpose of competition or personal gain, or pass on to others, any information provided by the BUYER as part of the business relationship, regarding plans, technical proposal and business details, including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and adequate care lest any such information is divulged.

4.8 The BIDDER commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.

4.9 The BIDDER shall not instigate or cause to instigate any third person to commit any of the acts mentioned above.

5. PREVIOUS TRANSGRESSION

5.1 The BIDDER declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any RSCL Department in India that could justify BIDDER's exclusion from the tender process.

5.2 If the BIDDER makes incorrect statement on this subject, BIDDER can be disqualified from the tender process or the contract , if already awarded, can be terminated for such reason.

6. EARNEST MONEY (SECURITY DEPOSIT)

6.1 Every BIDDER while submitting commercial bid, shall deposit an amount as specified in RFP as Earnest Money/Security Deposit, with the BUYER through any of the following instruments :

(i) Bank Draft or a Pay Order in favour of ……..

(ii) A confirmed guarantee by an Indian Nationalised Bank, promising payment of the guaranteed sum to the ……..(BUYER) ……on demand within three working days without any demur whatsoever and without seeking any reasons whatsoever, The demand for payment by the BUYER shall be treated as conclusive proof of payment.

(iii) Any other mode or through any other instrument (to be specified in the RFP).

6.2 The earnest Money/Security Deposit shall be valid up to a period of the complete conclusion of the contractual obligations to the complete satisfaction of both the BIDDER and BUYER, including warranty period, whichever is later.

6.3 In the case of successful BIDDER a clause would also be incorporated in the Article pertaining to Performance Bond in the Purchase Contract that the provisions of Sanctions for violation shall be applicable for forfeiture of Performance Bond in case of a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

6.4 No Interest shall be payable by the BUYER to the BIDDER on Earnest Money/Security Deposit for the period of its currency.

7. SANCTIONS FOR VIOLATIONS

7.1 Any breach of the aforesaid provisions by the BIDDER or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER) shall entitle the BUYER to take all or any one of the following actions, wherever required :-

(i) To immediately call off the pre contract negotiations without assigning any reason or giving any compensation to the BIDDER. However, the proceeding with the other BIDDER (s) would continue.

(ii) To forfeit fully or partially the Earnest Money Deposit (in pre-contract stage) and/or Security Deposit/Performance Bond (after the contract is signed), as decided by the BUYER and the BUYER shall not be required to assign any reason therefore.

(iii) To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.

(iv) To recover all sums already paid by the BUYER, and in case of the Indian BIDDER with interest thereon at 2% higher than the prevailing Prime lending Rate while in case of a BIDDER from a country other than India with Interest thereon at 2% higher than the LIBOR. If any outstanding payment is due to the BIDDER from the BUYER in connection with any other contract such outstanding payment could also be utilized to recover the aforesaid sum and interest.

(v) To encase the advance bank guarantee and performance bond/warranty bond, if furnished by the BIDDER, in order to recover the payments, already made by the BUYER, along with interest.

(vi) To cancel all or any other contracts with the BIDDER and the BIDDER shall be liable to pay compensation for any loss or damage to the BUYER resulting from such cancellation / rescission and the BUYER shall be entitled to deduct the amount so payable from the money (s) due to the BIDDER .

(vii) To debar the BIDDER from participating in future bidding processes of the RSCL for a minimum period of five years, which may be further extended at the discretion of the BUYER.

(viii) To recover all sums paid in violation of this Pact by BIDDER (s) to any middlemen or agent or broken with a view to securing the contract.

(ix) In cases where irrevocable Letters of Credit have been received in respect of any contract signed by the BUYER with the BIDDER, the same shall not be opened.

(x) If the BIDDER or any employee of the BIDDER or any person acting on behalf of the BIDDER, either directly or

Indirectly, is closely related to any of the officers of the BUYER, or alternatively if any close relative of an officer of the BUYER has financial interest/stake in the BIDDER's firm, the same shall be disclosed by the BIDDER at the time of filling of tender Any failure to disclose the interest involved shall entitle the BUYER to rescind the contract without payment of any compensation to the BIDDER.

The term 'close relative for this purpose would mean spouse whether residing with the RSCLservant or not, but not include a spouse separated from the RSCL servant by a decree or order of a competent court, son or daughter or step son or step daughter and wholly dependent upon RSCLservant but does not include a child or step child who is no longer in any way dependent upon the RSCLservant, or of whose custody the RSCLservant has been deprived of by or under any law, any other person related, whether by blood or marriage, to the RSCLservant or to the RSCLservant's wife or husband and wholly dependent upon RSCLServant.

(xi) The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly with any employee of the BUYER, and if he does so, the BUYER shall be entitled forth with to rescind the contract and all other contracts with the BIDDER The BIDDER shall be liable to pay compensation for any loss or damage to the BUYER resulting from such rescission and the BUYER shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER.

7.2 The decision of the BUYER to the effect that a breach of the provisions of this pact has been committed by the BIDDER shall be final and conclusive on the BIDDER However, the BIDDER can approach the Monitor (s) appointed for the purpose of this Pact.

8. FALL CLAUSE

8.1 The BIDDER undertakes that if has not supplied /is not supplying similar product/systems or subsystems at a price lower than that offered in the present bid in respect of any other Department of the RSCL or PSU and if it is found at any stage that similar product/systems or sub systems was supplied by the BIDDER to any other Department of the RSCL or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER to the BUYER, if the contract has already been concluded.

9. INDEPENDENT MONITORS

9.1 The BUYER will appoint Independent Monitors (hereinafter referred to as Monitors) for this Pact.

9.2 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.

9.3 The Monitors shall not be subject to instructions by the representatives of the Parties and perform their functions neutrally and independently.

9.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement including minutes of meetings. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/Subcontractor(s) with confidentially.

9.5 As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the BUYER.

9.6 The Monitor will submit a written report to the designated Authority of BUYER/Secretary in the Department/within 8 to 10 weeks from the date of reference or intimation to him by the BUYER/BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

10. FACILTATION OF INVESTIGATION

In case of any allegation of violation of any provisions of this Pact or payment of commission, the BUYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER and the BIDDER shall provide necessary information of the relevant documents and shall extend all possible help for the purpose of such examination.

11. LAW AND PLACE OF JURISDICTION
This Pact is subject to Indian Law, the place of performance and jurisdiction shall be the seat of the BUYER.

12. OTHER LEGAL ACTIONS
The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the any other law in force relating to any civil or criminal proceedings.

13. VALIDITY
13.1 The validity of this Integrity Pact shall be from the date of its signing and extend up to 5 years or the complete execution of the contract to the satisfaction of both the BUYER and the BIDDER/Seller whichever is later. In case BIDDER is unsuccessful , this Integrity Pact shall expire after six months from the date of the signing of the contract.

13.2 If one or several provisions of this Pact turn out to be invalid ; the remainder of this Pact shall remain valid. In such case, the parties will strive to come to an agreement to their original intentions.

The parties hereby sign this Integrity Pact at …….on……...

BUYER	**BIDDER**
Name of the Officer	MANAGING DIRECTOR
Designation	
Department /PSU	
Witness	**Witness**
1)……	1) ……
……	……
2)……	2) ……
……	……

Performance Security for Works Contract Period

Option 1: (Demand Guarantee)

[Insert Guarantor letterhead or SWIFT identifier code]

Beneficiary:*[Insert name and Address of the Employer]*

Date:*[Insert date of issue]*

PERFORMANCE GUARANTEE No.:*[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of Contractor,* (hereinafter called 'the Applicant') has entered into Contract No. *[insert reference number of the contract]*dated *[insert date]*with the Beneficiary, for the execution of *[insert name of the contract and brief description of the Works]* (hereinafter called 'the Contract').

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]*(*[insert amount in words]*),[1] such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for its demand or the sum specified therein.

This guarantee shall be valid until the date of issue of the **Works Contract Completion Certificate**.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

_____
[signature(s)]

[Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.]

[1] *The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency(cies) of the Contract or a freely convertible currency acceptable to the Beneficiary.*

APPENDIX-1

Qualification Information

<table>
<tr><td rowspan="4">1.1</td><td>Constitution or legal status of Biddcr/attach copy]</td><td colspan="4"></td></tr>
<tr><td>Place of registration of Firm/ Company (in case of other than individuals)</td><td colspan="4"></td></tr>
<tr><td>Principal place of business:</td><td colspan="4"></td></tr>
<tr><td>Name of Power of attorney holder of signatory of Bid (bidder)/«//ac7? copy]</td><td colspan="4"></td></tr>
<tr><td rowspan="8">1.2</td><td rowspan="8">Total annual volume of civil engineering construction work executed and payments received each year in the immediate five years preceding the year in which tenders are invited. (Attach certificate from Chartered Accountant)- indexed @ 10% (ten percent) compounded per year</td><td rowspan="2">Financia l Year</td><td colspan="3">(Rs. in crores)</td></tr>
<tr><td>'Civil engineering construction work' Turn over in the year</td><td>Add for indexing</td><td>Total</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
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</table>

Note :

1.1 *Preparatory firm, partnership firm with the certificate of registration by register/artocle and Memorandum of Association with Certificate of Incorporation.*

1.2 Mention and highlights the year, which the tendered considers for evaluation for the Committee

APPENDIX - 2

Information regarding minimum one similar work

(i) One Work completed as similar work during last ten years

(ii) Or being executing one such similar work

Sno	Project	Name of Employer	Value of Contract	Contract No.	Date of Issue of Work Order	Stipulated Date of Completion	Actual Date Of Completion	Value of Work Done	Remarks Remarks Explaining reasons for Delay, if any and the amount of Deductions due to delay Also mention if any Claim or dispute is Pending in any forum.
1	2	3	4	5	6	7	8	9	10

Note :-

(i) Attach certificates from the Engineer in change not belie the rank of Examiner or equivalent.

(ii) Tendered may attach certified copies of work order and completion certificate issued by Engineer in charge not below the rank of Executive Engineer

APPENDIX - 3

Work Performed on all classes of Civil Engineering Construction Works over the last ten years

Sno	Project Name	Name of Emoloyer	Description of Work	Value of Contract	Contea ct No.	Date Of Issue Work Orde r	Stipulated Date of Com pletio n	Actual Date Of Completion	Year wise value of work done as per certificate of employer Rs. In Lacs						Remarks explaining Reasons for Delay if Any and the amount Of deductions due to Delay also mention if Any claim or dispute Is pending in any Forum.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Note :-

(iii) Attach certificates from the Engineer in change not belie the rank of Examiner or equivalent.

(iv) Tendered may attach certified copies of work order and completion certificate issued by Engineer in charge not below the rank of Executive Engineer

APPENDIX - 4

Existing commitments and on going all classes of civil engineering construction works.

Sno	Project Name	Description of Work	Contract No & Year	Name& Adders Of the Employer	Value of Contract (Rs. Lakhs.)	Date of Issue of Work Order	Stipulated Date of Completion	Stipulated period of Completion in Months	Anticipate A date of Completion	Value of Work done Up to date Of issue Of N.I.T (Rs. Lakhs)**	Probable value of Works Remaining To be Completion (Rs. Lakhs) **	Anticipate Months Required Completion Of balance works	Value of Claims Or Dispute If Any pending
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Note –

1. ** Enclose certificates from Engineer (s) in charge (Not below the rank of Executive Engineer or equivalent) for value of work remaining to be completed, value of work done, anticipated date of completion.
2. Tendered may attach certified copies of work order issued by Engineer in charge not below the rank of Executive Engineer

APPENDIX - 5

Availability of Major items of Contractor's Equipment proposed for carrying out the Works. List all information requested below.

Item of equipment	Total number available	Description n, make, and age (Years), and capacity	Condition (new, good, poor) and number available	Nos. (i)Owned, (ii) leased, or (iii) to be purchased	If these are in use in some work, mention the details.	No. of equipment proposed to be utilized *in this work* (Out of total Nos.)
1	2	3	4	5	6	7

APPENDIX – 6

Qualifications of consultants /each technical personnel proposed for the Contract.

Position	Name	Qualify action	Date from which they are working in the bidders organization	Years of experience				Remark
				Road Works	Building Works	Bridge works	Others	
1	*2*	*3*	*4*	*5(a)*	*5(b)*	*5(c)*	*5(d)*	*6*

Note :

I. If any personal is proposed to be engaged, furnish details here under:- (if necessary use separate sheet for each -for C. V.) (Enclose certificates)

II. If any technical persons are to be changed during the construction periods, than it can be changed with prior intimation to the Engineer in charge.

APPENDIX – 7

Financial reports for the immediate previous five years: balance sheets, profit and loss statements, audited auditors' reports, etc., list below and attach copies.

Year	Income Tax Clearance Certificate (optional)	Balance Sheet	Profit & loss statement	Reserve brought forward in any	Net credit Balance if any [for debit show (-)]	Auditors, Report	Other information if the bidder wishes to submit
1	2	3	4	5	6	7	8

APPENDIX – 8

Information on current claims, arbitration, litigation in which the Bidder is involved.

Sl. no.	Name of Other party(s)	Agt. No. date year and Deptt.	Brief of cause of claims, arbitration /dispute (give reference of contract details)	Where Litigation pending (in the department/Court/a arbitration) (mention Deptt./Court /Arbitration)	Amount Involved/ claimed

Can use separate sheets for each agreements if necessary.

APPENDIX – 9

List of key plant & Equipment to be deployed on Contract Work to be filled by the Contractors

Sl.	Type of Equipment	Maximum age as on 1.04.14 (years)	Contract Package Size			
			From Rs. 3 Crores to Rs.10 Crores	From Rs. 10 Crores to Rs.30 Crores	From Rs. 30 Crores to Rs.50 Crores	From Rs Rs.50 Crores , above
1	2	3	4	5	6	7
	Total					

APPENDIX – 10

List of key plant & Equipment to be deployed on Contract Work

Sr. No.	Type of Equipment	Maximum age as on 1.04.12 (years)	Contract Package Size			
			From Rs. 3 Crores to Rs.10 Crores	From Rs. 10 Crores to Rs.30 Crores	From Rs. 30Crores to Rs.50 Crores	From Rs..5 Crores above
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
	Total					

Note: - The list &other Details of the equipment and plants as mentioned above are tentative. S.E. of the Nagar Nigam/Joint Director Office/ Directorate can modified the above list of the plant and equipment as per their requirements.

APPENDIX – 11

List of Technical person to be deployed on Contract work

Sl.	Personnel	Qualification	Contract Package Size			
			From Rs. 3 Crores toRs.10 Crores	From Rs. 1 1 Crores to Rs.30 Crores	From Rs. 31 Crores to Rs.50 Crores	From Rs. Rs.51 Crores& above
1	2	3	4	5	6	7
1	Project Manager	B.E. Civil+15years Exp in Water Supply Scheme. (5 years as manager)		1	1	1
2	Site Engineer	B.E. Civil+ 10 years Exp. (5 years in Water Supply.)	1	1	2	4
3	Plant Engineer	B.E. Mech.+lO Years Exp. or Dip. Mech+15 years Exp.	1	1	1	2
4	Quantity Surveyor	B.E. Civil+7 Years Exp. or Dip. Civil+ 10 Years Exp.	1	1	1	2
5	Soil & Material Engineer	B.E. Civil +10 years Exp.	1	1	1	2
6	Survey Engineer	B.E. Civil +5 years Exp. or Dip. Civil+8 years Exp.	1	1	1	2
		Total				

Note' - The list of (he Technical persons Qualification &Experience as mentioned above are tentative. S.E. of the Nagar Nigam/Joint Director Office/ Directorate can modified the above list as per their requirements.

APPENDIX – 12

CONTACT PERSONS

Sl No.	Name of Executive Engineer of the Division	Divisional	STD Code	Phone No. Office/ residence	Name District
1	2	3	4	5	6

APPENDIX - 13

Affidavit

I..... S/o.....

A.ged..... .years.....resident..... ..of.....

.....(address.....

.....)

(For and on behalf of.....), do

here by and herewith solemnly affirm / state on oath that: -

1. All documents and Information's furnished are correct in all respects to the best of my knowledge and belief
2. I have not suppressed or omitted any information as is required.
3. **I am/ We are neither black listed nor debarred by Govt. of India / Other State Govt. Departments/ Chhattisgarh State Govt. Departments/Urban Local Body.**
4. I hereby authorize the Nagar Nigam/Nagar Palika/Nagar panchayat Officials to getall the documents verified from appropriate source(s).

Deponent

(…….)

Authorized signatory / for and on behalf of

……

(**Affix Seal**)

Verification

I..... S/o..... do here by affirm that the contents stated in Para 1 to 4 above are true to the best of my knowledge and believe and are based on my / our record.

Verified that this ..... date of ..... 200... at (Place).....

Deponent

Seal of attestation by a Public

Notary with dateAuthorized signature / for and on behalf of.....

(Affix seal)

SPECIMEN LETTER OF AUTHORITY FROM BANK

FOR ALL BGs

(To be executed on Bank's Letter Head)

Date:To,

The Managing Director,

Raipur Smart City Limited

Dear Sir,

Sub: Our Bank Guarantee

No._____ dated_____forRs._____ favouring yourselves issued on a/c of M/s._____

(Name of contractor) ……

We confirm having issued the above-mentioned guarantee favouring yourselves, issued on account of M/s. _____validity for expiry uptodate_____and claim expiry date upto_____

We also confirm 1) _____ 2)

_____ is/are empowered to sign such Bank Guarantee on behalf of the Bank and his/their signatures is/are binding on theBank.

Name of signature of Bank Officer

SPECIMEN LETTER OF AUTHORITY FOR

SUBMISSION OF BID

(To be executed on Rs.100/- non-Judicial Stamp Paper)

To

The Managing Director,

Raipur Smart City Limited,

Dear Sir,

We----------

---------- do hereby confirm that Shri …… (Name, designation and Address) is/are authorized to represent us to bid, negotiate and conclude the agreement on our behalf with you against Tender no. ----------

---- and his specimen signature is appended here to. We confirm that we shall be bound by all and whatsoever our said signatory shall commit.

We understand that the communication made with him by the Employer/RSCL shall be deemed to have been done with us in respect of this Tender.

[*Specimen signature]*

Yours faithfully,

Signature:

Name & Designation:

For & on behalf of:

FORMAT FOR DECLARATION OF PREVAILING RATE of GST.

(To be submitted along with Technical Bid)

Date

FROM : (Name of Firm)

To :

The Managing Director,
Raipur Smart City Limited,
Ground Floor, Outdoor Stadium,
BudhaTaalab, Raipur, 492001

Dear Sir,

Subject "Improvement of selected Roads to SMART ROADS in new section consisting of Foot path, Utility Conduits, Water lines, Storm water drains, Road Markings, Street Light, Street Furniture, Traffic signage, Street Landscaping works and other Miscellaneous works Under "SMART CITY MISSION" - Smart Roads, Phase I& II" Raipur **(C.G)**", **Declaration of Prevailing rate ofGST.**

It is confirmed that rates quoted by us in our financial proposal are including Goods & Service Tax.

We hereby declare that prevailing rate of Goods & Service Tax for the work under consideration is ----% (In words ----------).

We remain,

Yours sincerely,

Managing Director/Proprietor/Authorized Signatory of the Bidder*

Name of the firm Address

Annex F: Format of Undertaking for compliance of ESIC provisions

EITHER [Where the entity complied all ESIC provisions]

I/We Mr./Miss ……..of <Entity name><Address> hereby certify that I/We am/are the Authorised representative of the entity and acting as <Designation>. Registration number of the entity is …….

I/We hereby certify that the (name of the bidder) has fully and correctly complied with all the provisions of The Employee's State Insurance Act 1948 till the date of submission of this bid. We also undertake to continue compliance all such provisions of law in future.

I/we hereby certify that the above facts are true to the best of my/our knowledge and belief and I/We understand that (name of the bidder) will be liable for legal prosecution in the event that the above facts are found to be false.

I/We agree that in case of noncompliance/violation under the respective laws covered under the certification,(name of the bidder) will be responsible for any consequences arising as per the provisions of law. The decision of the authority will be final.

I agree to furnish proof of such compliances as and when required by the authority.

Dated this _____ day of _____ 2018

[Signature]

[Company stamp]

[Name] in the capacity of _____, duly authorized to sign bids for and on behalf of _____.

***Undertaking in this case [i.e. Where ESIC provisions has been complied with] shall be given on plain paper**

OR [Where ESIC provisions are not applicable to the entity] *

I/We Mr./Miss ……..of <Entity name><Address> hereby certify that I/We am/are the Authorised representative of the entity and acting as <Designation>. Registration number of the entity is …….

I/We hereby certify that the ESIC provisions are not applicable for the (name of the bidder). I/We undertake to comply fully and correctly all the provisions of The Employee's State Insurance Act 1948 when these become applicable in future.

I/we hereby certify that the above facts are true to the best of my/our knowledge and belief and I/We understand that (name of the bidder will be liable for legal prosecution in the event that the above facts are found to be false.

I/We agree that in case of noncompliance/violation under the respective laws covered under the certification, (name of the bidder will be responsible for any consequences arising as per the provisions of law. The decision of the authority will be final.

I agree to furnish reason of such non-compliances, in writing, as and when required by the authority.

Dated this _____ day of _____ 2018

[Signature]

[Company stamp]

[Name] in the capacity of _____, duly authorized to sign bids for and on behalf of _____.

****Undertaking in this case [i.e. Where ESIC provisions are not applicable to the entity] must be given on a RS.100 Non-Judicial Stamp Paper**