GAIL (India) Limited

(A Government of India Undertaking)
A Maharatna Company

EOI No: GAIL/CGD/06 GA/PE LAYING/2026/02

NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS

Address: M/s GAIL INDIA LIMITED, Plot No. B, 35-36, Block B, Sector 1, Noida, Uttar Pradesh 201301.

VOLUME – I OF II

Appointed PMC for Contract Award Process on behalf of GAIL (India) Limited

BRIDGE AND ROOF COMPANY (INDIA) LIMITED
(A Govt. of India Enterprise)

Corporate office:
KANKARIA CENTER (4TH & 5TH FLOOR), 2/1 RUSSEL STREET, KOLKATA – 700071, WEST BENGAL (INDIA)

Head Office and Works:
427/1, GRAND TRUNK ROAD, HOWRAH - 711101.

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SECTION-I

REQUEST FOR PROPOSAL, CUTOUT SLIP AND FORMS & FORMATS

SECTION-I
" REQUEST FOR PROPOSAL, CUTOUT SLIP AND FORMS & FORMATS"

Ref No: GAIL/CGD/06 GA/PE LAYING/2026/02 **Date: 30.06.2026**

To,
PROSPECTIVE BIDDERS,

SUB: NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS.

Dear Sir/Madam,

1. **GAIL (India) Limited, Noida, having its registered office at 16, Bhikaji Cama Place, New Delhi – 110066 (CIN: L40200DL1984GOI018976),** a Maharatna Public Sector Enterprise and India's largest state-owned natural gas processing and distribution company, through its Project Management Consultant (PMC), **BRIDGE AND ROOF COMPANY (INDIA) LIMITED (B AND R) (CIN: U27310WB1929 GOI003601)**, hereby jointly invites Expressions of Interest (EOI) in the form of firm proposals from eligible bidders/contractors/legal entities for execution of PE pipeline network and associated work under GAIL's City Gas Distribution (CGD) Projects across six Geographical Areas (GAs), namely Varanasi, Patna, Ranchi, Jamshedpur, Bhubaneswar, and Cuttack, through the Walk-in Selection Process, in accordance with the eligibility criteria, scope of work, terms and conditions, and other requirements specified in the bidding documents.

2. The brief details of the EOI are as under:

S.N.	PARAMETERS	DETAILS
1.0	Brief Scope of Works/ Service /Job	Laying of PE Pipeline Network, Including Associated Works, at Varanasi, Patna, Ranchi, Jamshedpur, Bhubaneswar, and Cuttack for the Six CGD Projects of GAIL (India) Limited.
2.0	Method Of Selection	Walk-In Method
3.0	Eligibility And Selection Method	Interested bidders meeting the prescribed qualification criteria may participate in the Walk-In Process by submitting all requisite self-attested documents as specified in the bidding document. **Participation shall be considered on a first-in-first-out basis (FIFO),** subject to fulfillment of GAIL's requirements and at the sole discretion of GAIL.
4.0	Type of bidding system	Upfront Declared Contract Rate The contract shall be awarded at the upfront declared Schedule of Rates (SOR) specified in the EOI document. No price bid or financial quotation shall be sought from the bidders. The bidder shall be deemed to have accepted the declared rates by participating in the Walk-In Process.
5.0	Completion/Contract Period	Refer SCC and Scope of work
6.0	Bid Security / Earnest Money Deposit (EMD)	Not Applicable

	Office Addresses for Submission of Documents for Walk-In Methodology (Bidders must submit complete physical documents at any of the designated office addresses/walk-in venues for participation in a single or multiple GA(s).)	**Varanasi Location office address:** M/s GAIL INDIA LIMITED, City Gate Station, Harha, Ring Road, Bhagwanpur-Tulsipatti, Varanasi, Varanasi, Uttar Pradesh, 221003. Contact Details: GAIL, Mob:7268071339, Consultant, Mob:7058664482. **Patna Location office address:** M/s GAIL INDIA LIMITED, 6th Floor Indra Bhawan, Ram Charitra Singh Path, Boring Canal Road, Patna-800001, (Bihar). Contact Details: Shri. Rajan Kumar Jha, CM(CGD), Mob: 8475049049 Shri. Shubham Kailas Gawali, SE, Mob: 7218698558 **Ranchi Location office address:** GAIL(INDIA) LIMITED CGD, Shed No. 6 &7 Mecon Head Office Complex, Doranda Ranchi 834002. Contact Details: Shri. Pankaj Biswas, CM (CGD), Mob:8958653333 Shri. Sanjeev Kumar, PMC, Mob:7250940000 Shri Shiv Shyam Singh, PMC, Mob:8127449389 **Jamshedpur Location office address:** M/s GAIL INDIA LIMITED, J Block, 3rd Floor, Jeevan Prakash Building, Main Road Bistupur, Jamshedpur, East Singhbhum, Jharkhand, 831001. Contact Details: Shri. Durga Prasad Ambedkar, Mob:7838907872 Shri. Pradeep Sharma, Mob:9907072965 **Bhubaneswar & Cuttack Location office address:** M/s GAIL INDIA LIMITED, City Gas Distribution office, 2nd floor Block-1, BMC Bhawani Mall St, Saheed Nagar, Bhubaneswar, Odisha 751007. Contact Details: Shri. Roman Ranjan Dash, Mob:7978045145 Shri. Sanjib Prusty, Mob:9348633232
7.0	EOI document submission Instruction	1. **Bidders intending to participate in multiple GA(s) shall submit separate sealed envelopes for each GA, along with all required documents as specified in this EOI, only at the designated document receiving office of the respective GA**. For example, bidders participating in Varanasi GA shall submit their documents only at the Varanasi document receiving office only, while bidders participating in Bhubaneswar GA shall submit their documents only at the Bhubaneswar document receiving office only, and similarly for the other GAs. Submission of documents for multiple GA(s) at a single GA document receiving office shall not be permitted. 2. The bidder shall submit one additional copy of the " Cut-Out" filled-in format at the time of document submission. The same

		shall be acknowledged and returned as a receipt/token of document submission. 3. The ranking of bidders for each GA shall be determined on a First-In-First-Out (FIFO) basis, based on the date and time of bid submission recorded at the designated bid collection office of the respective GA. 4. Throughout this document, the terms 'EOI', 'Bid', 'Tender', 'Offer', 'Application' & 'Proposal' and their derivatives [Bidder/Tenderer, Bid/Tender/Offer etc.] are synonymous. **5. Offers submitted through e-mail or documents sent by post/courier shall not be considered for participation in the Walk-In Process.**
8.0	Walk-in Date & Time	**Date:** 03.07.2026 to 05.07.2026 **Timing:** 10:30 AM to 4:30 PM
9.0	Contact Details of Dealing Officer(s)	**For participation and initial physical document submission, as per the details provided in the above-mentioned Point No. 6.** Any queries pertaining to post-bid document submission requirements or the status of contract award shall be addressed to the authorized contact person(s) mentioned below. Sk. Aman Ali Mob: 7384310966 And Shri. Shashi Ranjan Mob: 7384310966 Bridge And Roof Co (I) Ltd 427/1, Grand Trunk Road, Howrah - 711101. **Official communication Email id:** tender.gailcgd@bridgeroof.co.in
10.0	Bids From Consortium/ Joint Venture/ NCLT Referred Bidders	Not Applicable.
11.0	Contract Performance Security (CPS)	Applicable.
12.0	Dealing GAIL Office Address	GAIL (India) Limited, Jubilee Tower, B-35 & 36, Sector-1, Noida-201301 (UP)-India.

	HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS	

CUT-OUT SLIP

(Bidder must Submit all required documents in a sealed envelope with the duly filled cut-out slip pasted over the sealed envelope)

EOI Ref No	:	GAIL/CGD/06 GA/PE LAYING/2026/, DT-30.06.2026
Job Description	:	NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS.
Last Date & Time of submission	:	05.07.2026, 4:30 PM
Bidders' Participation and Submission of EOI Documents for the GA.	:	**GA Name** (Tick any one which is applicable) VARANASI GA : ☐ PATNA GA : ☐ RANCHI GA : ☐ JAMSHEDPUR GA : ☐ BHUBANESWAR GA : ☐ CUTTACK GA : ☐
Name of the Bidder	:	
Contact No & email address	:	

Note:

1. **The bidder shall submit one additional copy of the duly filled-in format at the time of document submission, which shall be acknowledged by the receiving authority and returned to the bidder as proof of receipt of the submitted documents.**

FOR GAIL & B AND R OFFICIAL USE PURPOSE

Bid Doc. Received Date:

Bid Doc. Received Time:

Bid Doc. Receiver Name: **[Receiver Signature with Seal]**

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3. EVALUATION CRITERIA:

3.1. Category-I: Eligible for award of contracts for Rs. 50 Lakhs.

A. Technical Criteria:

The Bidder must have successfully executed / completed at least one work order for 'PNG connection/ PE pipeline work' in any CGD sector of GAIL (I) Ltd/ GAIL Gas Ltd and/ or their Group Companies, or for any other CGD company during the last seven (7) years, reckoned from the EOI submission due date.

Note:

a) If a bidder submits experience gained as a sub-contractor in any CGD company for laying of Natural gas PE pipeline network with associated work and such sub-contracting arrangement is duly supported by documentary evidence, including an approval and/or experience certificate issued by the concerned CGD company in the name of the bidder, thereby establishing that the sub-contracting was officially recognized and permitted, such experience shall be considered valid for evaluation purposes. Accordingly, the bidder shall be eligible to be considered for award of work for Rs. 50 Lac.
b) A Job executed by a Bidder / contractor for its own plant/ project cannot be considered as experience for the purpose of meeting the criteria mentioned above.

B. Financial Criteria: Not Applicable.

3.2 Category-II: Eligible for award of contracts for Rs. 25 Lakhs.

A. Technical Criteria:

The bidder shall have successfully executed / completed at least one work order of construction work in any industry or sector, within the last seven (7) years preceding the EOI submission due date.

Note:

a) Bidders having construction work experience as a sub-contractor/ labour contractor/ labour supply contractor/ construction machinery supplier/ or 'tools and tackles supplier for construction work under civil/ mechanical/structural/ architectural/ electrical/ OFC/ gas connection / water supply/ drainage/ telecom/ construction activities/ or any other utility sector' shall be considered eligible, subject to submission of acceptable documentary evidence of such experience.
b) A Job executed by a Bidder / contractor for its own plant/ project cannot be considered as experience for the purpose of meeting the criteria mentioned above.
c) Start-ups are not applicable.

B. Financial Criteria: Not Applicable.

Note for clause No 3.1 & 3.2:

a) **All documents submitted by bidders shall be duly self-attested.**

b) The window for submission of bids in each cycle shall remain open for three (03) business days, i.e., **03.07.2026 to 05.07.2026**, from **10:00 AM to 04:30 PM**.

c) The documents shall be submitted in hard copy to the respective GA office at the address(es) specified in Section I of the EOI.

d) Initially, the bidder will be evaluated for an award of up to Rs. 50 Lakhs. If found eligible, the bidder will be awarded work up to Rs. 50 Lakhs. If the bidder is not found eligible for Rs. 50 Lakhs but is found eligible for an award of up to Rs. 25 Lakhs, then the bidder will be awarded work up to Rs. 25 Lakhs. No clarification or confirmation regarding the value of the award will be sought from the bidders.

e) **Existing contractors currently working in a particular Geographical Area (GA) under the GAIL (India) Limited Six CGD Project shall be eligible to participate in the Walk-In Process for that GA only upon achieving 100% Mechanical Completion of earlier awarded work(s). However, this condition shall not apply in cases where short closure of the contract is necessitated due to reasons not attributable to the contractor.**

For the purpose of this methodology, 100% Mechanical Completion shall be deemed to have been achieved if any one of the following criteria is satisfied:

i. All physical works under the contract scope have been completed.
ii. The system has attained the "Ready for Commissioning" stage, with a minimum of 80% physical progress achieved under the contract scope.
iii. A minimum of 80% of the total contract value has been executed.

GAIL and/or its authorized Site Consultant may review the status of the work based on the aforesaid criteria and, at its sole discretion, recommend the contractor for participation in the ₹50 lakh award value category for PE pipeline network including associated works. Such recommendation/clearance (As per format F-11), duly issued by GAIL (India) Limited for the concerned GA, shall be submitted by the bidder along with the bid documents.

f) In the event that the number of vendors participating in a Walk-In Methodology cycle exceeds the requirement, contract awards shall be made on a First-In-First-Out (FIFO) basis, based on the ranking determined from the date and time of bid submission recorded at the designated bid collection office of the respective GA.

g) Any Technical Query (TQ) raised by B AND R/GAIL shall be replied to by the bidder within **24 hours of its issuance**, on a round-the-clock basis, failing which the bid shall be liable for rejection. **Queries shall be sent to the registered email id provided by the bidder during Bid submission.** Evaluation shall be conducted solely based on the documents submitted during the initial physical submission of the original bid documents.

h) All document evaluation shall be carried out by B AND R from its registered Howrah Office. Any additional document to be submitted against the Technical Query (TQ) raised during the evaluation process shall be replied to by the bidder to the communication email id provided within the stipulated time.

i) **The official email ID for issuance of Technical Queries (TQs) and submission of TQ replies shall be: tender.gailcgd@bridgeroof.co.in . In addition, physical documents submitted in compliance with the Technical Queries, along with supporting documents, if any, shall be submitted only to the Consultancy Services Department at Howrah office of, Bridge And Roof Company (India) Limited., 427/1, Grand Trunk Road, Howrah – 711101, from 10:00 AM to 04:30 PM.**

j) GCC for Works shall be applicable and the link for downloading, reading and acceptance of GCC for Works is as under:

https://gailtenders.in/Gailtenders/gccs/GCCWorksEnglish23112022.pdf

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k) **MSME or any other preference shall not be applicable as it is walk in methodology and SOR is on upfront declared basis.**

l) Any change in the firm's name, constitution or any other change affecting the legal status of the bidder during the evaluation process or during the execution of the awarded work shall not be accepted.

m) Experience certificates, completion certificates, work orders, purchase orders (POs), contracts, FOAs, LOAs, or any other credential documents submitted in support of the bid shall be in the name of the bidder participating in this EOI. **Credentials issued in the name of any other entity, sister concern, parent company, subsidiary company, group company, partnership firm, proprietorship concern, joint venture, or any other legal entity shall not be considered for qualification under this EOI.**

n) In the case of a proprietorship firm, the bidder shall submit documentary evidence establishing that the proprietorship concern and the proprietor constitute the same legal entity. Any change in proprietorship after submission of the bid shall render the submitted credentials invalid for evaluation and award purposes.

o) Bidders from countries sharing a land border with India, including entities owned or controlled by persons or organizations from such countries, shall not be eligible to participate in this EOI. Any bid received from such bidders shall be summarily rejected.

p) Bidders undergoing, or against whom insolvency resolution, liquidation, or bankruptcy proceedings have been initiated under the Insolvency and Bankruptcy Code, 2016, shall not be eligible to participate in this EOI, and such bids shall be rejected outright. The bidder shall inform GAIL/CMC/PMC within 15 days of any order initiating such proceedings. Failure to disclose such information shall result in rejection of the bid or cancellation/termination of the award/contract. GAIL/PMC reserves the right to cancel or terminate the contract without any liability if such proceedings are initiated at any stage. A declaration to this effect shall be submitted by the bidder in the prescribed format.

4. Documents required to be submitted/uploaded by bidder along with the bid for qualification of BEC:

Bidder must submit copies of below mentioned self-attested documents along with the bid for participation in walk-in process:

1. Document supporting Name and type of Entity (Affidavit / Undertaking on Letter head for Proprietorship, Deed of Partnerships for Partnership and Certificate of Incorporation along with MOA & AOA for Limited Company)
2. PAN
3. GST Registration.
4. PF/ESI Registration, wherever applicable.
5. Form F-1: Bidder's General Information (On Bidder's Letter Head)
6. Form F-2: Declaration on Proceedings as per Insolvency and Bankruptcy Code 2016 (On Bidder's Letter Head)
7. Form F-3: No Deviation Certificate (On Bidder's Letter Head)
8. Form F-4: Agreed Terms & Conditions (On Bidder's Letter Head)
9. Form F-10: Undertaking for deployment capability. (On Bidder's Letter Head)

10. Form F-11: Certificate of Mechanical Completion / Eligibility for Participation in the Walk-In Process (Applicable only to bidder(s) who have previously been awarded work by GAIL (India) Limited under the Six CGD Project).
11. Copy of Power of Attorney (As applicable).
12. Work experience documents as mentioned below:

BEC Clause no.	Description	Documents required for qualification
3.1	**Category-I: Eligible for award of contracts up to Rs. 50 Lakhs.**	
A	Experience criteria: Technical	a) Copy of detailed Work order /FOA/ LOA along with Schedule of Rates. b) The bidder shall submit a recommendation/certification from GAIL (India) Limited confirming 100% Mechanical Completion of the existing order(s) under the Six CGD Project for the particular GA/GA(s) for which the bid is being submitted. *"For the purpose of this methodology, 100% Mechanical Completion shall be deemed to have been achieved if any one of the following criteria is satisfied:* *i. All physical works under the contract scope have been completed.* *ii. The system has attained the "Ready for Commissioning" stage, with a minimum of 80% physical progress achieved under the contract scope.* *iii. A minimum of 80% of the total contract value has been executed."* **c) Execution / Completion certificate in case bidder submits experience of CGD company other than six CGD of GAIL (India) Ltd.**
3.2	**Category-II: Eligible for award of contracts up to Rs. 25 Lakhs.**	
	Experience criteria: Technical	a) Copy of detailed work order /FOA/ LOA/ Agreement. b) Copy of the Completion/Execution Certificate issued by the Client/End User/Owner. **OR** In case the bidder has executed the work as a sub-contractor, a Completion/Execution Certificate issued by the Main Contractor shall also be acceptable, provided that the certificate clearly specifies the details of the project executed by the bidder.

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5. EOI EVALUATION METHODOLOGY:

GAIL intends to award contracts under this cycle for the respective GAs as per its requirement.

S/N	GA Name
1	Varanasi
2	Patna
3	Ranchi
4	Jamshedpur
5	Bhubaneswar
6	Cuttack

a) The ranking of bidders for each GA shall be determined on a First-In-First-Out (FIFO) basis, based on the date and time of bid submission recorded at the designated bid collection office of the respective GA.

b) If any bidder is found to be technically non-responsive, disqualified, or otherwise ineligible during the evaluation process, the work shall be awarded to the next technically qualified bidder.

c) Submission of all requisite documents as stipulated in this EOI is mandatory. In the absence of any required document(s), M/s GAIL/B AND R reserves the right to reject the bid outright without seeking any clarification from or making any reference to the bidder(s). Further, GAIL reserves the right to discontinue the EOI process at any stage and shall have the sole discretion to qualify, accept, or reject any application or proposal for award of work, in whole or in part, without assigning any reason whatsoever.

d) List of bidders, as provided by GAIL (I) LTD for the respective GA, who are ineligible for bid evaluation and contract award, as per note to Clauses 3.1 and 3.2 under point no (d).

6. DISTRIBUTION OF WORK / AWARD OF CONTRACT

a) GAIL/ BANDR shall award the work under this cycle for the respective GAs to technically qualified bidders on a First-In, First-Out (FIFO) basis, based on the bids received at the respective GA bid collection offices. Contracts shall be awarded until the GA-wise requirement of GAIL for the respective cycle is fulfilled.
b) FOA/LOA shall be issued by B AND R on behalf of GAIL (I) LTD. to the technically qualified bidder (s).
c) The successful bidder shall collect the hard copy of the FOA from the respective GAIL GA office and submit the duly signed acceptance to the same GA office. All post-award activities, correspondence, execution, administration, and contract management related to the awarded work shall be handled exclusively by the respective GAIL GA site(s).
d) Contractor awarded through walk-in methodology under GAIL six CGD project may be offered job upto Rs.50 Lacs, after satisfactory performance in the awarded job before next cycle start.

7. POST-AWARD CONTRACT INSTRUCTIONS

a) The successful bidder shall execute the Contract Agreement in the prescribed format on a non-judicial stamp paper of a minimum value of INR 100/- (Rupees One Hundred only), at its own cost, within Seven (07) days from the date of issuance of the Fax of Acceptance (FOA). The duly executed Contract Agreement shall be submitted to the Consultancy Services Department, Bridge

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And Roof Company (India) Limited., 427/1, Grand Trunk Road, Howrah – 711101.

b) After issuance of the Contract/FOA, the successful bidder shall furnish Contract Performance Security (CPS) equivalent to 10% of the awarded Contract Value (excluding GST). The bidder can submit CPS for 10% of the total awarded value.

OR

Initially, the bidder shall submit an Initial Security Deposit (ISD) equivalent to 2.5% of the awarded Contract Value (excluding GST) in the form of **DD/IMPS/NEFT/RTGS** within fifteen (15) days from the date of issuance of the Contract/FOA, as per the details provided below. **Submission of the CPS in any other form, such as Bank Guarantee (BG), Surety Bond, Fixed Deposit Receipt (FDR), or any other instrument, shall not be accepted.**

The balance 7.5% shall be recovered through deductions from the Running Account (RA) Bills until the total Security Deposit, including the ISD and deductions from RA Bills, reaches 10% of the awarded Contract Value (excluding GST).

Documentary evidence of CPS/ISD submission or payment shall be furnished to the respective GA EIC/responsible official(s), as instructed by GAIL. The CPS amount shall be released as per the terms and conditions mentioned in GAIL GCC for works.

For submission through online banking transactions such as IMPS/NEFT/RTGS, the details of GAIL's bank account are as under:

Beneficiary Name	GAIL (India) Limited
Correspondence address	**STATE BANK OF INDIA** Corporate Accounts Group II. 4th & 5th Floor, Red Fort Capital, Parsvnath Towers, Bhai Veer Singh Marg, Near Gole Market, New Delhi - 110 001.
Account no.	**00000032849362991**
Branch Code	17313
IFSC CODE	**SBIN0017313**
SWIFT CODE	**SBININBB824**
MICR CODE	**110002562**
PAN No. (SBI)	AAACS8577K
TAN No.	DELS55939C
Fax no. :	011-23745580
Email	agmib.cag2del@sbi.co.in

Note:

i. Contract/ Order Value as mentioned above shall be exclusive of taxes and duties.

ii. The Contract Performance Security (CPS)/Security Deposit (SD) will be retained for a period of 90 days beyond the contract period/ duration and applicable Warranty/ Guarantee /Defect Liability Period (if any). And shall be released there after by GAIL.

iii. Contract Performance Security (CPS) is to be submitted by bidder within 15 days after issuance of Fax of Acceptance (notification of Award) and in event of delay in submission of CPS, the contract can be terminated.

iv. The Contract Performance Security (CPS) shall be submitted only in the in the form of **DD/IMPS/NEFT/RTGS**. Submission of the CPS in any other form, such as Bank

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Guarantee (BG), Surety Bond, Fixed Deposit Receipt (FDR), or any other instrument, shall not be accepted.

c) The successful bidder shall submit all requisite insurance policies, labour licenses, indemnity bonds, registrations, permits, and other statutory documents as required under the Contract, FOA, LOA, GCC, SCC, and bidding documents to the respective GAIL Site/GA Office within the stipulated time period and prior to commencement of the work, as applicable.

d) The successful bidder shall coordinate with the respective GAIL GA/Site officials for all post-award activities, including but not limited to kick-off meetings, allocation of work locations, issuance of Free Issue Materials (FIM), approval of technical documents, site execution, statutory clearances, permissions, legal and regulatory compliances, certification of measurements, billing, and all other contract administration matters. All site-related activities and contract execution matters shall be handled and administered exclusively by the respective GAIL GA/Site team.

e) **PRS shall not be applicable for contracts awarded through the Walk-In Methodology**. However, periodic/intermittent vendor performance evaluations shall be carried out and, in the event of default in the prescribed parameters, the contract may be short-closed by the SIC on the recommendation of the EIC and with the approval of the OIC, without any liability on either side. Such defaulting contractors/agencies shall also be restricted from participating in subsequent Walk-In cycles in GAIL (I) Ltd six CGD Project.

f) To improve work progress, motivation, and accountability, GAIL may, at its sole discretion, decide to pay the proposed incentive directly to the plumbers instead of routing it through the contractors. The incentive, if approved by GAIL, shall be ₹200 (Rupees Two Hundred only) per domestic PNG connection and shall be linked to the actual execution of work, subject to certification by the Engineer-in-Charge (EIC). The decision of GAIL regarding the applicability, continuation, modification, or withdrawal of the incentive scheme shall be final and binding on all concerned.

Separate vendor codes for individual plumbers shall not be created. Instead, payments towards such incentives shall be processed through a designated common vendor code and disbursed directly to the concerned plumbers, or coupons of equivalent amount will be provided. The payment shall be made (out of VIM) based on certification by the concerned SIC/CIC.
Incentive to plumbers shall be admissible only against new completed PNG connections.
Existing connections where only GAS IN is pending shall not be considered.

Reconciliation statement of plumber incentive payments vis-à-vis actual number of PNG connections completed shall be prepared and duly certified by EIC.

g) Bills under contracts awarded through Walk-In Methodology shall be processed through VIM based on certification by EIC & SIC/CIC without mandatory routing through Anjani Portal. bills under contracts awarded through Walk-In Methodology shall be processed through VIM, based on SES & Invoice certification by EIC & SIC/CIC without mandatory routing of measurements through the Anjani Portal. However, measurement sheet prepared and maintained by SIC /EIC at their end.

h) GAIL has implemented Vendor Invoice Management (VIM) system titled as #SARATHI# for automation, digitization & centralization of Account Payable process w.e.f. 01.04.2023.

Accordingly, Supplier/ Contractor/Service Provide/ Consultant is required to upload digital in-voice on 'Sparsh' portal. The system optimizes and simplifies the process of receiving, managing,

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monitoring and forwarding invoices for payment process. The link of 'Sparsh' portal is as under:

https://sparsh.gail.co.in/flipper/#/login

The 'Help Manual' hyperlink to access the detailed User Manual, Demo Videos, FAQ#s and other relevant information is available on 'Sparsh' portal.

Only digital invoice is to be uploaded on 'Sparsh' portal and all other supporting documents along with copy of invoice are to submitted to concerned as defined in Purchase Order (PO)/ Letter of Acceptance (LoA).

Further, vendors/contractors would be required to mention details of Purchase Order/ Letter of Acceptance number on the face of Invoice.

Invoices should be system generated and no handwritten invoices shall be eligible for OCR conversion.

i) DOCUMENTS FOR PAYMENT:

Payment terms shall be as mentioned in SCC.

However, for release of payment, Contractor is required to submit invoice along with other documents as mentioned in SCC. The final bill is to be submitted within one month after completion.
Further, GAIL is in process of implementing Vendor Invoice Management (VIM). After implementation of same (to be communicated separately), Contractor/ Vendor to forward the invoice on VIM Collection Center or upload digital invoice on Portal (details of same will be provided separately). The copy of invoice and all other document mentioned above or in order/ contract is to be forwarded to address provided in order/contract.

j) ORDER TRANSMITTAL SYSTEM:

The complete PO/LOA shall be shared through order/contract transmittal system after intimation through email.

Contractor is requested to visit https://gailonline.com/home.html and click on link order/contract transmittal system (It can be found under Vendor Zone (Portal for Suppliers)) or https://gailebank.gail.co.in/GOGA_AUDIT/frmUserLogin.aspx

Therein, in order to access the detailed order/contract, supplier/contractor shall be prompted to enter your email id. Further an OTP shall be sent on your registered mobile number. After entering OTP, supplier/contractor shall be allowed to download complete PO/LOA.

k) In case contractor is not able to submit all required documents along with the invoice, up to 75% of invoice amount/ admissible payment may be released within seven (07) days of submission of invoice based on certification of SES by EIC & SIC/CIS. This is to enable sufficient liquidity with the contractor for fast-track work progress.

The Contractor shall submit the invoice at a minimum interval of 15 (fifteen) days, provided that the value of work executed is at least 20% of the awarded contract value.

Balance payment shall be released after submission and verification of complete supporting documents. EIC and SIC to ensure that all the retention are released on or before the release of

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final bill.

l) Free-issue materials shall be issued to the contractor only after submission of the initial Contract Performance Security (CPS), the applicable insurance, and an Indemnity Bond covering the free-issue materials.

m) The first payment to the contractor shall be released only after submission of the Contract Performance Security (CPS)/Security Deposit (SD) in accordance with the provisions of the Contract/FOA.

n) Execution and Monitoring

The contractors/agencies shall deploy adequate manpower, tools & tackles, machinery, safety equipment and supervisory staff for timely execution of works.

Execution progress shall be monitored regularly by:
EIC,
SIC/CIC
Concerned OIC.

Periodic vendor performance evaluation shall be carried out considering:

i. Execution progress,
ii. Resource deployment,
iii. Quality of work,
iv. Safety compliance,
v. Adherence to committed milestones.

Further allocation and award of order for additional quantities shall be considered only in case of satisfactory performance.

o) GAIL has the sole discretion to qualify or accept the applications for award of additional job or reject the proposal without assigning any reason whatsoever.

p) Sub-contracting shall not be permitted for contracts awarded through this Walk-In Methodology.

q) A bidder who has been awarded work in a particular cycle under the Walk-In Methodology for the GAIL Six CGD Project shall not be considered for award in the immediately subsequent cycle within the same GA unless substantial completion of the previously awarded work has been achieved, subjected to the following conditions:

- Completion of at least 80 % of job awarded during the contract period with Satisfactory performance,
- After submission of an undertaking that a separate and independent team/resources shall be deployed for execution of the new job.
- Compliance with quality and safety requirements.

r) Merely submitting of documents to the GAIL (I) team does not guarantee the award of work.

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FORMS & FORMAT

LIST OF FORMS & FORMAT

Bidders may download the editable copy of the below mentioned format from the link provided below:
https://workdrive.publicmgovcloud.in/external/cdfe030bbae5bdf7345e4708d6cb33db/download

Form No.	Description
F-1	BIDDER'S GENERAL INFORMATION
F-2	DECLARATION ON PROCEEDINGS AS PER INSOLVENCY AND BANKRUPTCY CODE 2016
F-3	NO DEVIATION CERTIFICATE FORMAT
F-4	AGREED TERMS & CONDITIONS
F-5	REAL TIME GROSS SETTLEMENT (RTGS) / NATIONAL ELECTRONIC FUNDS TRANSFER (NEFT) MANDATE FORM
F-6	INDEMNITY BOND
F-7	NO CLAIM CERTIFICATE
F-8	CONTRACT AGREEMENT
F-9	PROFORMA OF INDEMNITY BOND FOR SUPPLY OF MATERIALS BY EMPLOYER
F-10	UNDERTAKING FOR DEPLOYMENT CAPABILITY
F-11	CERTIFICATE OF MECHANICAL COMPLETION / ELIGIBILITY FOR PARTICIPATION IN WALK-IN PROCESS
F-12	POWER OF ATTORNEY

F-1

BIDDER'S GENERAL INFORMATION

To,
M/s GAIL (INDIA) LIMITED

SUB: NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS.

EOI NO: GAIL/CGD/06 GA/PE LAYING/2026/

1	Bidder Name	M/s.
2	Status of Firm	Proprietorship Firm/Partnership firm/ Limited Liability Partnership (LLP) firm/Public Limited/ Pvt. Limited/ Govt. Dept. / PSU/ Others If Others Specify:_____ [Enclose relevant certificates / partnership deed/certificate of Registration, as applicable]
3	Name of Power of Attorney holders of bidder	
4	Number of Years in Operation	
5	Bidder Registered Office address *(As per GST certificate)*	
6	Bidder's address where order/contract is to be placed	
7	Telephone Number/ Mobile no. of address where order is to be placed	
8	E-mail address	
9	Website	
10	Mobile Number:	
11	PAN No.	
12	GST No.	
13	EPF Registration No.	

14	ESI code No.	
15	Whether Micro or Small Enterprise	Yes / No
	Whether MSE is owned by SC/ST Entrepreneur(s)	Yes / No
	Whether MSE is owned by Women	Yes / No
16	Whether Bidder is Startups or not	Yes / No (*If Yes, the bidder shall submit a valid Startup Recognition Certificate issued by DPIIT, Government of India, specifically covering the field/sector relevant to the scope of work specified in this EOI, duly self-attested by the bidder and certified by a Chartered Accountant.*)
	In case of Start-up confirm the following: (i) Date of its incorporation/ registration [The certificate shall only be valid for the entity upto ten years from the date of its incorporation/ registration] (ii) Whether turnover for any financial years since incorporation/ registration has exceed Rs.100 Crores.	
17	Name of the GA bidder Participating For: *(Mentioned any one GA name: Varanasi/ Patna/Ranchi/Jamshedpur/ Bhubaneswar/ Cuttack)*	

Note: * *GAIL intent to place the contract directly on the address from where Works are to be supplied. In case, bidder wants contract at some other address or Works are to supplied from multiple locations, bidder is required to provide in their bid, the address on which contract is to be placed.*

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

GAIL_Internal

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DECLARATION ON PROCEEDINGS AS PER INSOLVENCY AND BANKRUPTCY CODE 2016

To,
M/s GAIL (INDIA) LIMITED

SUB: NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS.

EOI NO: GAIL/CGD/06 GA/PE LAYING/2026/

Dear Sir,

I/ We hereby declare that I/We, M/s_____, declare that:

I/We am/are not undergoing insolvency resolution process or liquidation or bankruptcy proceeding as on date.

Further, I/We also confirms that in case there is any change in status of this declaration at any stage of bidding/ execution (in case of award), the same will be promptly informed to GAIL.

It is understood that if this declaration is found to be false, GAIL (India) Limited shall have the right to reject awarded contract, and forfeit the CPS. If the bid has resulted in a contract, the contract will be liable for termination without prejudice to any other right or remedy (including banning or holiday listing) available to GAIL (India) Limited.

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

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No Deviation Certificate Format

(To be printed on the Bidder's Official Letterhead)

Date:

To,
M/s GAIL (INDIA) LIMITED

SUB: NO DEVIATION CERTIFICATE

SUB: NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS.

EOI NO: GAIL/CGD/06 GA/PE LAYING/2026/

Dear Sir/Madam,

With reference to the above-mentioned bid, I/We hereby certify that I/We have carefully read and clearly understood all the terms, conditions, technical specifications, and requirements mentioned in the bid document.

I/We hereby confirm that our bid/offer is submitted strictly in accordance with all the bid conditions, and there are no deviations or variations of any kind (technical or commercial) from the stipulated terms.

In the event of observance of any deviation in any part of our offer at a later date, whether implicit or explicit, I/We agree that such deviations shall stand null and void, and our bid may be rejected.

Thanking you,

Yours faithfully,

(Signature of Authorized Signatory)

Name: [Name of Signatory]

Designation: [Designation]

Company Seal:

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AGREED TERMS & CONDITIONS

To,
M/s GAIL (INDIA) LIMITED

SUB: NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS.

EOI NO: GAIL/CGD/06 GA/PE LAYING/2026/

This Questionnaire duly filled in, signed & stamped must form part of Bidder's Bid and should be returned along with Un-priced Bid. Clauses confirmed hereunder need not be repeated in the Bid.

Sl.	DESCRIPTION	BIDDER'S CONFIRMATION
1.	The Bidder hereby confirms its unconditional acceptance of all bid conditions, terms and clauses, including the applicable Terms of Payment specified in the Bid Document, without any deviation, exception, reservation, or qualification.	
2.	The bidder hereby confirms that the contract shall be executed entirely at their own risk and liability. GAIL shall not be held responsible for any misconduct, negligence, or unlawful act committed by the bidder during the execution of the contract.	
3.	Bidder confirms that Contract Performance Security will be furnished as per Bid Document within 15 days of FOA in case of successful bidder.	
4.	The bidder hereby confirms and agrees that the contract may be terminated by GAIL at any stage, without assigning any reason whatsoever, under the following conditions: a) Involvement in any corrupt, fraudulent, collusive, or coercive practices, whether before or after award of the contract. b) Any dispute arising during the execution of the contract. c) Non-performance or unsatisfactory performance as determined by the Engineer-in-Charge.	
5.	Bidders confirm compliance to Completion Schedule as specified in Bid document and the same shall be reckoned from the date of Fax of Acceptance.	
6.	The bidder hereby confirms that the contract shall be executed in full compliance with all applicable laws, rules, regulations, and statutory provisions, including but not limited to the Minimum Wages Act, labour laws, insurance requirements, and other applicable Acts and policies.	
7.	The bidder hereby confirms that all responsibilities and liabilities pertaining to manpower, machinery, tools, equipment, and related resources deployed for execution of the contract shall solely rest with the bidder throughout the contract period.	

Sl.	DESCRIPTION	BIDDER'S CONFIRMATION
8.	All correspondence must be in ENGLISH language only.	
9.	The bidder hereby confirms that they have carefully reviewed the rates specified in the Schedule of Rates (SOR) and unconditionally accept the same for execution of the contract.	
10.	The bidder hereby confirms that they have acquainted with complete scope of work, sites etc to execute work.	
11.	Bidder confirms that all Bank charges associated with Bidder's Bank regarding release of payment etc. shall be borne by Bidder.	
12.	Bidder understands that bid Document is not exhaustive. In case any activity though specifically not covered in description of 'Schedule of Rates' but is required to complete the work as per Scope of Work, Conditions of Contract, or any other part of Bidding document, the accepted rates will deem to be inclusive of cost incurred for such activities unless otherwise specifically excluded. Bidder confirms to perform for fulfilment of the contract and completeness of the supplies in all respect within the scheduled time frame and accepted price.	
13.	Bidder hereby confirms that they are not on 'Holiday' by GAIL or Public Sector Project Management Consultant (like EIL, Mecon, BANDR only due to "poor performance" or "corrupt and fraudulent practices") or banned by Government department/ Public Sector on due date of submission of bid. Further, Bidder confirms that neither they nor their allied agency/(ies) (as defined in the Procedure for Action in case of Corrupt/ Fraudulent/ Collusive/ Coercive Practices) are on banning list of GAIL or the Ministry of Petroleum and Natural Gas. Bidder also confirms that they are not under any liquidation, court receivership or similar proceedings or 'bankruptcy'. In case it comes to the notice of GAIL that the bidder has given wrong declaration in this regard, the same shall be dealt as 'fraudulent practices and action shall be initiated as per the Procedure for action in case of Corrupt/ Fraudulent/ Collusive/ Coercive Practices. Further, Bidder also confirms that in case there is any change in status of the declaration prior to award of contract, the same will be promptly informed to GAIL by them.	
14.	Bidder confirms that they have read and understood the General Conditions of Contract – Works available on GAIL's Tender website (http://gailtenders.in/Gailtenders/gccs.asp) & no 'exception / deviation' anywhere has been taken in the same and that they shall abide by provisions of relevant GCC.	
15.	Bidder certifies that they would adhere to the Fraud Prevention Policy of GAIL [available on GAIL's website (www.gailonline.com)] and shall not indulge themselves or allow	

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Sl.	DESCRIPTION	BIDDER'S CONFIRMATION
	others (working in GAIL) to indulge in fraudulent activities and that they would immediately apprise GAIL of the fraud/suspected fraud as soon as it comes to their notice. Concealment of facts regarding their involvement in fraudulent activities in connection with the business transaction(s) of GAIL is liable to be treated as crime and dealt with by the procedures of GAIL as applicable from time to time.	
16.	Bidder confirms that (i) any variation in GST at the time of supplies for any reasons, other than statutory, including variations due to turnover, shall be borne by them and (ii) any error of interpretation of applicability of rate of GST (CGST & SGST/ UTGST or IGST) on components of an item and/or various items of tender by them shall be dealt as per bid document , GAIL policy and terms and condition.	
17.	Further, GAIL/B AND R reserve the right to seek in physical form (original/notarized true copy) of any document(s) submitted, at any time during the processing of EOI and execution of contract. In the event of failure of a bidder/vendor/contractor to submit original/notarized true copy of any document(s) within the specified time schedule, CPS of the bidder/vendor/contractor shall be forfeited.	

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

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REAL TIME GROSS SETTLEMENT (RTGS) / NATIONAL ELECTRONIC FUNDS TRANSFER (NEFT) MANDATE FORM

(To be issued on vendors letter head)

1. Vendor/customer Name :
2. Vendor/customer Code:
3. Vendor /customer Address:
4. Vendor/customer e-mail id:
5. Particulars of bank account:
   a) Account Holder / Beneficiary Name
   b) Name of Bank:
   c) Name of branch:
   d) Branch code:
   e) Address:
   f) Telephone number:
   g) Type of account (current/saving etc):
   h) Account Number:
   i) IFSC code of the bank branch:
   j) Reason (if) Vendor (S.N.1) and Account Holder / Beneficiary name (S.N. 5 (a)) is not the same

I/We hereby authorize GAIL (India) Limited & its wholly owned subsidiary to release any amount due to me/us in the bank account as mentioned above. I/We hereby declare that the particulars given above are correct and complete. If the transaction is delayed or lost because of incomplete or incorrect information, we would not hold the GAIL(India) Limited responsible.

(Signature of vendor/customer)

BANK CERTIFICATE

We certify that Account Holder/Beneficiary_____has an Account no. _____and IFSC Code :_____with us and we confirm that the details given above are correct as per our records.

Bank stamp

Date (Signature of authorized officer of bank)

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INDEMNITY BOND

WHEREAS GAIL (India) Ltd. (hereinafter referred to as "**GAIL**") which expression shall, unless repugnant to the context include its successors and assigns, having its registered office at 16, Bhikaiji, Cama Place, R.K. Puram, New Delhi 110066 has entered into a contract with M/s*……. (hereinafter referred to as the "**Contractor"**) which expression shall unless repugnant to the context include its representatives, successors and assigns, having its registered office at *…….. and on the terms and conditions as set out, inter-alia in the [*mention the work order/LOA/EOI No.*]and various documents forming part thereof, hereinafter collectively referred to as the '**CONTRACT'** which expression shall include all amendments, modifications and / or variations thereto.

GAIL has also advised the Contractor to execute an Indemnity Bond in general in favour of GAIL indemnifying GAIL and its employees and Directors including Independent Directors from all consequences which may arise out of any prospective litigation or proceedings filed or may be initiated by any third party, including any Banker / financial institution / worker(s) /vendor(s)/ subcontractor(s) etc. who may have been associated or engaged by the Contractor directly or indirectly with or without consent of GAIL for above works.

NOW, THEREFORE, in consideration of the promises aforesaid, the Contractor hereby irrevocably and unconditionally undertakes to indemnify and keep indemnified GAIL and all its employees, Directors, including Independent Directors, from and against all/any claim(s), damages, loss, which may arise out of any litigations/ liabilities that may be raised by the Contractor or any third party against GAIL under or in relation to this contract. The Contractor undertakes to compensate and pay to GAIL and/or any of its employees, Directors including Independent Directors, forth with on demand without any protest the amount claimed by GAIL for itself and for and on behalf of its employees, Directors including Independent Directors together with direct/indirect expenses including all legal expenses incurred by them or any of them on account of such litigation or proceedings.

AND THE CONTRACTOR hereby further agrees with GAIL that:

(i) This Indemnity shall remain valid and irrevocable for all claims of GAIL and/or any of its employees and Directors including Independent Directors arising out of said contract with respect to any such litigation / court case for which GAIL and/or its employees and Directors including Independent Directors has been made party until now or here-in-after.

(ii) This Indemnity shall not be discharged/revoked by any change/ modification/amendment/assignment of the contract or any merger of the Contractor with other entity or any change in the constitution/structure of the Contractor's firm/Company or any conditions thereof including insolvency etc. of the Contractor, but shall be in all respects and for all purposes binding and operative until any/all claims for payment of GAIL are settled by the Contractor and/or GAIL discharges the Contractor in writing from this Indemnity.

The undersigned has full power to execute this Indemnity Bond for and on behalf of the Contractor and the same stands valid.

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SIGNED BY :
For *[Contractor]*
Authorised Representative

Place:
Dated:

Witnesses:
1.
2

GAIL_Internal

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NO CLAIM CERTIFICATE

(TO BE SUBMITTED BEFORE RELEASE OF CPS/SECURITY DEPOSIT)

[On the Letter-head of Supplier/Vendor]

We, _____, a company incorporated under the laws of India/ a Consortium between *___ and *____ (*name of Consortium partners to be inserted*)/ a Partnership Firm consisting of *___ and *___ (*name of Partners to be inserted*)/ a Sole Proprietorship (as the case may be), having its registered office at _____ and carrying on business under the name and style M/s. _____ were awarded the contract by GAIL (India) Ltd. in reference to EOI No. _____ dated _____ ("Order/Contract").

After completion of the above-said items/job under the Order/Contract, we have scrutinized all our claims, contentions, disputes, issues and we hereby confirm that after adjusting all payments received by us against our R.A. Bills and final bill, we have no claims, dues, issues and contentions from GAIL (India) Ltd.

We further absolve GAIL (India) Ltd. from all liabilities present or future arising directly or indirectly out of the Contract.

There is no economic duress or any other compulsion on us for submission of this no claim certificate.

Signature with Seal of Supplier/Vendor

Dated:

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PROFORMA FOR CONTRACT AGREEMENT

FOA No.: **DATE:**

Contract Agreement for the work of _____ of GAIL (INDIA) LTD. made on _____between (Name and Address)_____ _____ , hereinafter called the "CONTRACTOR" (which term shall unless excluded by or repugnant to the subject or context include its successors and permitted assignees) of the one part and GAIL (INDIA) LIMITED hereinafter called the "EMPLOYER" (which term shall, unless excluded by or repugnant to the subject or context include its successors and assignees) of the other part.

WHEREAS

A. The EMPLOYER being desirous of having provided and executed certain work mentioned, enumerated or referred to in the Tender Documents including Letter Inviting Tender, General Tender-Notice, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings, Plans, Time Schedule of completion of jobs, Schedule of Rates, Agreed Variations, other documents has called for Tender.

B. The CONTRACTOR has inspected the SITE ·and surroundings of WORK specified in the Tender Documents and has satisfied himself by careful examination before submitting his tender as to the nature of the surface, strata, soil, sub-soil and ground, the form and nature of site and local conditions, the quantities, nature and magnitude of the work, the availability of labour and materials necessary for the execution of work, the means of access to SITE, the supply of power and water thereto and the accommodation he may require and has made local and independent enquiries and obtained complete information as to the matters and thing referred to, or implied in the tender documents or having any connection therewith and has considered the nature and extent of all probable and possible situations, delays, hindrances or interferences to or with the execution and completion of the work to be carried out under the CONTRACT, and has examined and considered all other matters, conditions and things and probable and possible contingencies, and generally all matters incidental thereto and ancillary thereof affecting the execution and completion of the WORK and which might have influenced him in making his tender.

C. The Tender Documents including the Notice Letter Inviting Tender, General Conditions of Contract, Special Conditions of Contract, Schedule of Rates, General Obligations, SPECIFICATIONS, DRAWINGS, PLANS, Time Schedule for completion of Jobs, Letter of Acceptance of Tender and any statement of agreed variations with its enclosures copies of which are hereto annexed form part of this CONTRACT though separately set out herein and are included in the expression "CONTRACT" wherever herein used.

AND WHEREAS

The EMPLOYER accepted the Tender of the CONTRACTOR for the provision and the execution of the said WORK at the rates stated in the schedule of quantities of the work and finally approved by

GAIL_Internal

EMPLOYER (hereinafter called the "Schedule of Rates") upon the terms and subject to the conditions of CONTRACT.
NOW THIS AGREEMENT WITNESSETH AND IT IS HEREBY AGREED AND DECLARED AS FOLLOWS:-

1. In consideration of the payment to be made to the CONTRACTOR for the WORK to be executed by him, the CONTRACTOR hereby covenants with EMPLOYER that the CONTRACTOR shall and will duly provide, execute and complete the said work and shall do and perform all other acts and things in the CONTRACT mentioned or described or which are to be implied there from or may be reasonably necessary for the completion of the said WORK and at the said times and in the manner and subject to the terms and conditions or stipulations mentioned in the contract.

2. In consideration of the due provision execution and completion of the said WORK, EMPLOYER does hereby agree with the CONTRACTOR that the EMPLOYER will pay to the CONTRACTOR the respective amounts for the WORK actually done by him and approved by the EMPLOYER at the Schedule of Rates and such other sum payable to the CONTRACTOR under provision of CONTRACT, such payment to be made at such time in such manner as provided for in the CONTRACT.

AND

3. In consideration of the due provision, execution and completion of the said WORK the CONTRACTOR does hereby agree to pay such sums as may be due to the EMPLOYER for the services rendered by the EMPLOYER to the CONTRACTOR, such as power supply, water supply and others as set for in the said CONTRACT and such other sums as may become payable to the EMPLOYER towards the controlled items of consumable materials or towards loss, damage to the EMPLOYER'S equipment, materials construction plant and machinery, such payments to be made at such time and in such manner as is provided in the CONTRACT.

   It is specifically and distinctly understood and agreed between the EMPLOYER and the CONTRACTOR that the CONTRACTOR shall have no right, title or interest in the SITE made available by the EMPLOYER for execution of the works or in the building, structures or work executed on the said SITE by the CONTRACTOR or in the goods, articles, materials etc., brought on the said SITE (unless the same specifically belongs to the CONTRACTOR) and the CONTRACTOR shall not have or deemed to have any· lien whatsoever charge for unpaid bills will not be entitled to assume or retain possession or control of the SITE or structures and the EMPLOYER shall have an absolute and unfettered right to take full possession of SITE and to remove the CONTRACTOR, their servants, agents and materials belonging to the CONTRACTOR and lying on the SITE.

   The CONTRACTOR shall be allowed to enter upon the SITE for execution of the WORK only as a licensee simpliciter and shall not have any claim, right, title or interest in the SITE or the structures erected thereon and the EMPLOYER shall be entitled to terminate such license at any time without assigning any reason.

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The materials including sand, gravel, stone, loose, earth, rock· etc., dug up or excavated from the said SITE shall, unless otherwise expressly agreed ·under this CONTRACT, exclusively belong to the EMPLOYER and the CONTRACTOR shall have no right to claim over the same and such excavation and materials should be disposed off on account of the EMPLOYER according to the instruction in writing issued from time to time by the ENGINEER-IN-CHARGE.

In Witness whereof the parties have executed these presents in the day and the year first above written.

Signed and Delivered for and on on behalf of EMPLOYER	Signed and Delivered for and on behalf of the CONTRACTO Rs
GAIL (INDIA) LIMITED	**(M/s. *NAME OF THE CONTRACTOR*)**
_____	_____
_____	_____
Date:	**Date:**
Place:	**Place:**

IN PRESENCE OF TWO WITNESSES

1. _____	**1.** _____
_____	_____
_____	_____
2. _____	**2.** _____
_____	_____
_____	_____

GAIL_Internal

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PROFORMA OF INDEMNITY BOND FOR SUPPLY OF MATERIALS BY EMPLOYER

(To be executed on non-judicial stamped paper of appropriate value)

WHEREAS GAIL (INDIA) LTD. (hereinafter referred to as GAIL) which expression shall unless repugnant to the context includes their legal representatives, successors and assigns having their registered office at 16, Bhikaiji Gama Place; R.K.Puram New Delhi has entered into a CONTRACT with _____ (hereinafter referred to as the CONTRACTOR which expression shall unless repugnant to the context include their legal representatives, successors and assigns) for _____ on the terms and conditions as set out, inter-alia, in the CONTRACT No _____ Dated_____ and various documents forming part thereof hereinafter collectively referred to as the "CONTRACT" which expression shall include all amendments, modifications and/or variations thereto.

AND WHEREAS

i. GAIL has agreed to supply to the CONTRACTOR, equipment, plants and materials (finished, semi-finished and raw)for the purpose of EXECUTION of the. said CONTRACT by the CONTRACTOR (the equipment, plants and materials to be supplied by GAIL to the CONTRACTOR, hereinafter for the sake of brevity referred to as the "said materials") and pending execution by the CONTRACTOR of the CONTRACT incorporating the said materials, the said materials shall be under the custody and charge of the CONTRACTOR and shall be kept, stored, altered, worked upon and/or fabricated at the sole risk and expense of the CONTRACTOR.

ii. As a pre-condition to the supply of the said materials by GAIL to the CONTRACTOR, GAIL has required the CONTRACTOR to furnish to GAIL an Indemnity Bond in the manner and upon terms and conditions hereinafter indicated.

NOW, THEREFORE, in consideration of the premises aforesaid the CONTRACTOR hereby irrevocably and unconditionally undertakes to indemnify and keep indemnified GAIL from and against all loss, damage and destruction (inclusive but not limited to any or all loss or damage or destruction to or of the said materials or any item or part thereof by theft, pilferage, fire, flood, storm, tempest, lightning, explosion, storage, chemical or physical action or reaction, binding, warping, exposure, rusting, faulty workmanship, faulty fabrication, or faulty method or technique of fabrication, strike, riot, civil commotion, or other act or omission or commission whatsoever within or beyond the control of the CONTRACTOR, misuse and misappropriation (inclusive but not limited to the misuse or misappropriation by the CONTRACTOR and the Contractor's servants and/or agents) whatsoever to, or of in the said materials or any part of them thereof from the date that the same or relative part of item thereof was supplied to the CONTRACTOR upto and until the date of return to GAIL of the said materials or relative part of item thereof or completed fabricated works(s) incorporating the said material and undertake to pay to GAIL forthwith on demand in writing without protest or demur the value as specified by GAIL of the said material or item or part thereof, lost, damaged, destroyed, misused and/or misappropriated, as the case may be or, together with GAIL'S costs and expenses (inclusive of but not limited to handling, transportation, cartage, insurance, freight, packing and inspection costs/or expenses upto) and aggregate limit of Rs._____ Only (Rupees in word only).

AND THE CONTRACTOR hereby agrees with GAIL that:

i. This Indemnity/Undertaking shall be a continuing Indemnity/ Undertaking and shall remain valid and irrevocable for all claims of GAIL arising hereunder upto and until the midnight of _____ . However, if the CONTRACT for which this Indemnity/Undertaking is given is not completed by this date, the CONTRACTOR hereby agrees to extend the Indemnity/Undertaking till such time as is required to fulfil the CONTRACT.

ii. This Indemnity/Undertaking shall not be determined by any change in constitution or upon insolvency of the CONTRACTOR but shall be in all respects and for all purposes be binding and operative until payment of all moneys payable to GAIL in terms of hereof.

iii. The mere statement of allegation made by or on behalf of GAIL in any notice or demand or other writing addressed to the CONTRACTOR as to any of the said material or item or part thereof having been lost , damaged, destroyed, misused or misappropriated while in the custody of the CONTRACTOR and/or prior to completion of the completed fabricated work(s) and delivery to job site thereof incorporating the said materials shall be conclusive of the factum of the said material or item or part thereof having been supplied to the CONTRACTOR and/or the loss, damage, destruction, misuse or misappropriation thereof, as the case may be, while in the custody of the CONTRACTOR and/or prior to the completion of the completed fabricated work(s) and delivery to job site thereof incorporating the said materials without necessity on the part of GAIL to produce any documentary proof or other evidence whatsoever in support of this.

iv. The amount stated in any notice of demand addressed by GAIL to the CONTRACTOR as to the value of such said materials lost, damaged, destroyed, misused or misappropriated, inclusive relative to the costs and expenses incurred by GAIL in connection therewith shall be conclusive of the value of such said materials and the said cost and expenses as also of the amount liable to be paid to GAIL to produce any voucher, bill or other documentation or evidence whatsoever in support thereof and such amount shall be paid without any demur and on demand and no dispute shall be raised concerning the same.

The undersigned has full power to execute this Indemnity Bond on behalf of the CONTRACTOR under the Consortium Attorney dated. _____.

(SIGNED BY COMPETENT AUTHORITY)

Place:

Dated:

Official seal of the CONTRACTOR

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UNDERTAKING FOR DEPLOYMENT CAPABILITY

To,
M/s GAIL (INDIA) LIMITED

SUB: NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS.

EOI NO: GAIL/CGD/06 GA/PE LAYING/2026/

Dear Sir,

I/We, M/s _____, having our registered office at _____, hereby undertake and confirm the following:

1. We have carefully examined and understood all the terms and conditions of the EOI Document.
2. In the event of award of the work, we shall mobilize and deploy adequate manpower, tools & tackles, equipment, machinery, vehicles, and other required resources for execution of the work at the respective Geographical Area(s) (GA) within the time stipulated in the Contract.
3. We confirm that we possess the necessary organizational capability, technical expertise, financial resources, and operational infrastructure to execute multiple work orders simultaneously, if awarded.
4. We further undertake that the minimum required manpower, along with the necessary supervisory personnel, shall be deployed throughout the contract period to ensure the timely and quality execution of the work.
5. We agree to augment the deployed resources, if required by GAIL/Engineer-in-Charge, to meet the project schedule and maintain the desired progress without claiming any additional cost.
6. We understand that failure to mobilize and deploy adequate resources within the stipulated time or maintain the required deployment during the execution of the contract may result in action as per the provisions of the Contract, including cancellation of the award, forfeiture of Contract Performance Security, and/or any other action deemed appropriate by GAIL.
7. We hereby certify that the above declaration is true and correct. In the event that any information furnished by us is found to be false, incorrect, or misleading at any stage, GAIL and/or its authorized consultant shall have the right to reject our bid, cancel the contract, and take such action as deemed appropriate in accordance with the provisions of the EOI and the applicable policies, procedures, and guidelines of GAIL.

This undertaking is submitted voluntarily as part of our bid.

For and on behalf of the *(Bidder's company Name)*

_____
Authorised signature & Seal

Name Authorized Signatory:
Designation:
Date:

F-11

CERTIFICATE OF MECHANICAL COMPLETION / ELIGIBILITY FOR PARTICIPATION IN WALK-IN PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS UNDER EOI NO: GAIL/CGD/06 GA/PE LAYING/2026/02.
(To be issued on the letter head of GAIL (India) Limited of the concerned Geographical Area (GA) and submitted in original along with the bid document.)

1. Name of Contractor:

2. Name of Geographical Area (GA):

3. Number of Contract(s) Previously Awarded in the Above GA:

A. Status of Mechanical Completion

This is to certify that the contractor has achieved 100% Mechanical Completion of the above-mentioned contract(s), based on any one of the following criteria (✓ whichever is applicable):

☐ **Option-I:** All physical works under the contract scope have been completed.

☐ **Option-II:** The system has attained the **"Ready for Commissioning"** stage, with a minimum of **80% physical progress** achieved under the contract scope.

☐ **Option-III:** A minimum of **80% of the total contract value** has been executed.

Accordingly, the contractor is **eligible to participate in the Walk-In Process for PE Pipeline Network Including Associated Works** for the above-mentioned Geographical Area (GA), in accordance with the provisions of the Walk-In Methodology.

Issued By

On Behalf of GAIL (I) LTD.

_____
Authorized Signature and Stamp

Name:

Designation:

Date:

GAIL_Internal

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POWER OF ATTORNEY

(To be submitted on the letter-head of company)

To,
M/s GAIL (INDIA) LIMITED

SUB: NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS.

EOI NO: GAIL/CGD/06 GA/PE LAYING/2026/

Name of Bidder:

"The undersigned_____(*Name of LEGAL PERSON**) is lawfully Authorized to represent and act on behalf of the company M/s. _____ *(Name of bidder)* whose registered address is_____ _____and does hereby appoint Mr./Ms_____*[name of authorized person/(s)]* _____ *(Designation)* of M/s_____ *(Name of bidder)* whose signature appears below to be the true and lawful attorney/(s) and authorize him/her to sign the bid (both digitally and manually) and all subsequent communications, agreements, documents etc., in the name and on behalf of the company in connection with the above mentioned work.

The signature of the authorized person/(s) herein constitutes unconditional obligations of M/s_____(*Name of bidder).*

This Power of Attorney shall remain valid and in full force and effect before we withdrawal it in writing (by fax, or mail or post). All the documents signed (within the period of validity of the Power of Attorney) by the authorized person/(s) herein shall not be invalid because of such withdrawal.

SIGNATURE OF THE LEGAL PERSON

_____
(*Name of person with Company seal*)

SIGNATURE OF THE AUTHORIZED PERSON/(S)

_____
(*Name of person*)
Designation:
Contact No:
E-mail id:

SECTION II

GENERAL CONDITIONS OF CONTRACT (GCC)

General Conditions of Contract - Works is available on GAIL's Tender website (http://gailtenders.in/Gailtenders/gccs.asp).

GAIL_Internal

SECTION-III

SPECIAL CONDITIONS OF CONTRACT (SCC)

Note: Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract (GCC)-WORKS.

GAIL Special Condition of Contract (SCC) shall prevail over GCC Works where there is conflict on terms & conditions

GAIL_Internal

1. GENERAL

1.1 Special conditions of contract (SCC) shall be read in conjunction with the General Conditions of Contract (GCC). Schedule of rates, specifications of work, drawings and any other document forming part of this contract wherever the context so requires.

1.2 Notwithstanding the sub-division of the document into these separate sections and volumes, every part of each with and into the contract so far as it may be practicable to do so.

1.3 Where any portion of the GCC is repugnant to or at variance with any provisions of the special conditions of contract, then unless a different intention appears, the provision(s) of the special conditions of contract shall be deemed to override the provision(s) of GCC only to the extent that such repugnancies of variations in the special conditions of contract are not possible of being reconciled with the provisions of GCC.

1.4 Wherever it is stated in this Bidding Document that such and such a supply is to be effected or such and such a work is to be carried out, it shall be understood that the same shall be effected/carried out by the contractor at his own cost, unless a different intention is specifically and expressly stated herein or otherwise explicit from the context. Contract value (also referred to as Contract price) shall be deemed to have included such cost.

1.5 The materials, design and workmanship shall satisfy the applicable relevant Indian Standards, the job specifications stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied. In the absence of any Standard/ Specifications/codes of practice for detailed specifications covering any part of the work covered in this Bidding on the contractor.

1.6 In partial modification to Clause No.21.0 of GCC the following shall apply:
In case of contradiction between Indian or other applicable Standards, General Conditions of Contract, Special Conditions of Contract, Specifications, drawings, Schedule of Rates, the following shall prevail in order of precedence:

i) Contract Agreement
ii) Detailed Letter of acceptance alongwith statement of Agreed variations.
iii) Fax / Letter of Intent / Fax of Acceptance
iv) Schedule of Rates as enclosures to letter of acceptance
v) Job / Particular Specifications
vi) Drawings
vii) Technical / Material Specifications
viii) Special Conditions of Contract
ix) Instructions to Bidders (ITB)
x) General Conditions of Contract
xi) Indian Standards
xii) Other Applicable Standard

1.7 It will be contractor's responsibility to bring to the notice of Engineer-in-charge any irreconcilable conflict in the contract documents before starting the work(s) of making the supply with reference which the conflict exists.

GAIL_Internal

1.8 In the absence of any specifications covering any material, design of work(s) in the same shall be performed / supplies / executed in accordance with Standards Engineering Practice as per the instructions / directions of the Engineer-in-charge, which will be binding on the Contractor.

1.9 The requirements of any statutory body and authority like Indian boiler regulation, Tariff Advisory Committee, Chief controller of Explosives, etc, shall govern where these are more stringent than the requirements specified above.

1.10 Owner's representative means authorized representative of Owner (i.e. M/s GAIL (INDIA) LTD) and / or Consultant.

2.0 THE WORK

2.1 Scope of work

The scope of work covered in this Contract will be as described in Annexure-1 to SCC at Particular job specifications, Standard Specifications, Schedule of Rates etc.

2.2 Scope of Supply

The scope of supply covered in this Contract will be as described in Annexure-2 to SCC Particular Job Specifications, Standard Specifications, and Schedule of Rates etc.

2.3 Time schedule

2.3.1 The work shall be executed strictly as per time schedule given in Annexure-3 to SCC. The period of completion given includes the time required for mobilization as well as testing, rectifications, if any, retesting, demobilization and completion in all respects to the satisfaction of the Engineer-in-Charge

2.3.2 A joint program of execution of work will be prepared by the Engineer-in-Charge and Contractor. This program will take into account the time of completion mentioned in 2.3.1 above.

2.3.3 Monthly/Weekly execution program will be drawn up by the Engineer-in-Charge jointly with the Contractor based on availability of materials, work fronts and the joint program of execution as referred to above. The contractor shall scrupulously adhere to the Targets/Programs by deploying adequate personnel, Construction Equipment, Tools and Tackles and also by timely supply of required materials coming within his scope of supply as per Contract. In all matters concerning the extent of target set out in the weekly/monthly program and the degree of achievement, the decision of the Engineer-in-Charge will be final and binding on the Contractor.

2.3.4 Contractor shall give every day category-wise labour and equipment deployment report along with the progress of work done on previous day in the proforma prescribed by the Engineer-in-Charge.

2.4 Measurement of Works

In addition to the provisions of Clause 88.1 of the General Conditions of Contract and associated provisions thereof, the provisions of Annexure – 4 to SCC shall apply.

2.5 Terms of Payment

Terms of Payment will be as specified in Annexure – 5 to SCC.

2.6 Temporary Works

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All temporary works, ancillary works, enabling works, including dewatering of surface and subsoil water, temporary drains at the work site, preparing approaches to working areas, wherever required, for execution of the work, shall be the responsibility of Contractor.

2.7 **Temporary Fencing**

The Contractor shall, at his own costs and expenses, erect and maintain in good condition temporary fences and gates along the boundaries of the site assigned to him wherever required as per instruction of Engineer-in-charge. Wherever trenching is being done specially at crossing site near habitation and public movement. The contractor shall provide barricading as per sketch enclosed and provide proper night light as per requirement and to the satisfaction of EIC. The Contractor shall, except when authorized by the Engineer-in-Charge, confine his men, materials and plant etc. within the site of which he is given possession. The Contractor shall not use any part of the site for purpose not connected with the works unless prior written permission or consent of the Owner/Engineer-in-Charge has been obtained. Access to site shall be made only through the approved gateways. The Contractor shall maintain sufficient watchmen at site to the satisfaction of the Owner/Engineer-in-Charge.

2.8 **Contractor's Temporary Structure**

The Contractor may, at his own costs and expenses and subject to the approval of the Engineer-in-Charge and statutory authorities, construct offices, stores, workshop and remove the same as per the orders of the Engineer-in-Charge on completion of the contract. Whenever required the Contractor shall furnish such details of his temporary works as may be called for by the Owner/Engineer-in-Charge as to their safety and efficiency. The Owner/Engineer-in-Charge may direct those temporary works which he considers unsafe or, inefficient be removed and replaced in a satisfactory manner. The Contractor shall immediately follow Owner/Engineer-in-Charge's direction/instruction, on maintenance of all the equipment's and he shall ensure that they are suitable for the work and is maintained in such a manner as to ensure their efficient working. The Owner/Engineer-in-Charge, may if they deem fit, direct the Contractor to remove from site any equipment which are not efficient and/or prejudicial to the quality of work to be replaced by equipment to their satisfaction. The Contractor shall immediately follow Owner/Engineer-in-Charge's direction/instruction.

2.9 **Statutory Approvals**

2.9.1 All associated activities required for obtaining necessary clearances, permissions, approvals, all licenses from all concerned authorities in respect of pipeline crossing & all related works shall be the responsibility of the Contractor and the cost of the same shall be deemed to have been included in the accepted prices.

The approval from any authority required as per statutory rules and regulations of Central / State Government shall be the Contractor's responsibility unless otherwise specified in the Bidding Document. The application on behalf of the Owner for submission to relevant authorities along with copies of required certificate complete in all respects shall be prepared and submitted by the Contractor well ahead of time so that the actual construction of the work is into delayed for want of the approval/inspection by concerned authorities. The inspection of the works by the authorities shall be arranged by the Contractor and necessary coordination and liaison work in this respect shall be the responsibility of the Contractor. However statutory fees paid, if any, for all inspections and approvals by such authorities shall be reimbursed at actual by the Owner to the Contractor on production of documentary evidence.

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Any change/addition required to be made to meet the requirements of the statutory authorities shall be carried out by the Contractor free of charge. The inspection and acceptance of the work by statutory authorities shall however, not absolve the Contract from any of his responsibilities under this Contract.

2.10 **Quality Assurance**

2.10.1 Bidder shall include in his offer the quality assurance program containing the overall quality management and procedures, which is required to be adhered to during the execution of contract. After the award of contract detailed quality assurance program shall be prepared by the contractor for the execution of Contract for various works, which will be mutually discussed and agreed to.

2.10.2 The Contractor shall establish document and maintain an effective quality assurance system as outlined in recognized codes.

2.10.3 Quality Assurance System plans/procedures of the Contractor shall be furnished in the in the form of QA manual. This document should cover details of the personnel responsible for the quality assurance, plans or procedures to be followed for quality control in respect of Design, Engineering, Procurement, Supply, Installation, Testing and Commissioning.

The quality assurance system should indicate organizational approach for quality control and quality assurance of the construction activities, at all stages of work at site as well as at manufacturer's works and dispatch of materials.

2.10.4 The Employer/ consultant / Consultant or their representative shall reserve the right to inspect / witness, review any or all stages of work at shop/site as deemed necessary for quality assurance.

2.10.5 The Contractor has to ensure the deployment of quality Assurance and Quality Control Engineer(s) depending upon the quantum of work. This QA /QC group shall be fully responsible to carry out the work as per standards and all code requirements. In case Engineer-in-charge feels that contractor's QA/QC Engineer (s) are incompetent or insufficient, contractor has to deploy other experienced Engineer(s) as per site requirement and to the full satisfaction of engineer-in-charge.

2.10.6 In case contractor fails to follow the instructions of Engineer –in-charge with respect to above clauses, next payment due to him shall not be released unless until he complies with the instructions to the full satisfaction of Engineer –in –charge.

2.10.7 The contractor shall adhere to the quality assurance system as per specification enclosed in the bidding document as Annexure-6.

2.11 **Notice and Licenses**

The Contractor shall at his costs and expenses give to the Municipal or Panchayat, Police and other authorities all notices etc., that may be required in law to be given and obtain all necessary permissions and licenses etc., for temporary obstructions, enclosures and pay all fees, taxes charges etc. which may be leviable by such authorities for that purpose. The Contractor shall make good any damage to the adjoining property whether public or private.

2.12 **Working Hours**

Depending upon the requirements, time schedule/ drawn up programs and the target set to complete the job in time the works may have to continue beyond normal working hours to the extent of round the clock and on holidays also for which no extra claim shall be entertained.

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2.13 **Responsibility of Contractor**

Preparing approaches and working area for the movement and operation or the cranes, levelling the area for assembly and erection shall also be the responsibility of the Contractor. The Contractor shall acquaint himself with access availability, facilities such as railway siding, local labour etc.

The procurement and supply in sequence and at the appropriate time of all materials and consumables covered under Contractor's scope of supply shall be entirely the Contractor's responsibility. Contractor shall not use any of the equipment or materials issued to him by Owner for temporary works, manufacturing erection aids etc. Misuse of materials will be seriously viewed and deduction at penal rates will be made from the Contractors bill for such quantities that are misused.

Contract Price is deemed to be inclusive of all expenses towards above responsibilities.

2.14 **Additional Works/Extra Works**

Owner reserve their right to execute any additional works/ extra works, during the execution of Work, either by themselves or by appointing any other agency, even though such works are incidental to and necessary for the completion of works awarded to the Contractor. In the event of such decisions taken by Owner, Contractor is required to extend necessary cooperation and act as per the instructions of Engineer-in-Charge.

2.15 **Compensation for Idle Time**

The owner shall make every reasonable effort to have the materials and working front available so as not to delay laying activities. No idle time claim shall be entertained under any circumstances.

2.16 **Power and Water Connection**

The Purchaser / Consultant will not provide any power and water during construction period. Contractor shall apply and obtain necessary power and water during connection from relevant authority and will pay its usage charge or arrange the same from the other sources.

3.0 **Construction**

OWNER reserves the right to inspect all phases of Contractor's operations to ensure conformity to the SPECIFICATIONS. Owner will have Engineers, Inspectors or other duly authorized representatives, made known to the Contractor present during progress of the WORK and such representatives shall have free access to the WORK at all times. The presence or absence of an Owner's representative does not relieve the Contractor of the responsibility for quality control in all phases of the WORK. In the event that any of the WORK being done by the Contractor or any Sub-Contractor is found by Owner's representatives to be unsatisfactory or not in accordance with the DRAWINGS, procedures and SPECIFICATIONS, the Contractor shall, upon verbal notice of such, revise the work in a manner to conform to the relevant DRAWINGS, procedures and SPECIFICATIONS.

3.1 **Rules and Regulations**

Contractor shall observe in addition to Codes specified in respective specification, all national and local laws, ordinances, rules and regulations and requirements pertaining to the work and shall be responsible for extra costs arising from violations of the same.

3.2 **Procedures**

GAIL_Internal

Various procedures and method statements to be adopted by Contractor during the construction as required in the respective specifications shall be submitted to Engineer-in-Charge in due time for approval. No construction activity shall commence unless approved by Engineer-in-Charge in writing.

3.3 **Security**

The work being in protected area, entry into the work area shall be restricted and governed by issue of photo gate passes by the Security/CISF. The Contractor shall arrange to obtain through the Engineer-in-Charge, well in advance, all necessary entry permits/gate pass for his staff and labour and entry and exit of his men and materials shall be subject to vigorous check by the security staff. The Contractor shall not be eligible for any claim or extension of time whatsoever on this account.

3.4 **Drawings and Documents**

3.4.1 The drawings accompanying the bid document (if any) are of indicative nature and issued for bidding purpose only. Purpose of these drawing is to enable the bidder to make an offer in line with the requirements of the Employer/Consultant. However, no extra claim whatsoever, shall be entertained for variation in the "Approved for Construction" and "Bid document drawings" regarding any changes/units. Construction shall be as per drawings/specifications issued/approved by the Engineer-in-Charge during the course of execution of work. Detailed construction drawings (wherever required) on the basis of which actual execution of work is to proceed will be prepared by the contractor.

3.4.2 The drawings and documents to be submitted by the Contractor to Employer/Consultant after award of the work as per the requirements enlisted in the bidding document shall be for Employer/Consultant's review, information and record. The Contractor shall ensure that drawings and documents submitted to Employer/Consultant are accompanied by relevant calculations, data as required and essential for review of the document/ drawings. Owner/CMC shall review the drawings/ documents within two weeks from the date of submission provided the same are accompanied by relevant calculations, data as required and essential for review.

3.4.3 All documents and drawings including those of Contractor's sub-vendors manufacturers etc. shall be submitted to Employer/Consultant after fully vetted in detail, approved and co-opted by the Contractor & shall bear Contractor seal/ certifications to this effect. All documents/drawings & submissions made to Employer/Consultant without compliance to this requirement will not be acceptable and the delay & liability owing to this shall be to the Contractor's account.

3.4.4 The review of documents and drawings by Employer/Consultant shall not absolve Contractor from his responsibility to meet the requirements of specifications, drawings etc. and liabilities for mistakes and deviations. Upon receiving the comments on the drawing/documents reviewed by Employer/Consultant, Contractor shall incorporate the comments as required and ensure their compliance.

3.4.5 Copies of all detailed working drawing relating to the works shall be kept at the contractors' office at the site and shall be made available to the Engineer-in-charge/ Employer/Consultant at any time during execution of the contract. However, no extra claim what so ever shall be entertained for any variation in the "approved/issued for construction drawings" and "tender/bid drawings" regarding any changes/units unless otherwise agreed.

3.4.6 The Contractor shall rectify any inaccuracies, errors and non-compliance to contractual requirements. Any delay occurring on this shall not construed a reason for delay/ extension.

3.5 **Excavation by blasting**

GAIL_Internal

Excavation by blasting is not permitted wherever required in hard strata other mechanical tools shall be used.

3.6 Construction Equipment & Mechanization of Construction Activities

Contractor shall, without prejudice to his overall responsibility to execute and complete the Work as per specifications and time schedule, adopt as far as practicable, mechanized construction techniques for major site activities. However, Contractor agrees that he will deploy the required numbers and types of the part & machinery applicable for different activities in consultation with the Engineer-In-Charge during execution of works.

The Contractor shall mechanize the construction activities to the maximum extent by deploying all necessary construction equipment/machinery in adequate numbers and capacities.
Wherever Structural/Piping works are included in the scope, the Contractor's responsibilities shall include establishing and maintaining of a proper fabrication workshop with transportation facilities to site to carryout fabrication of steel structures, piping specials etc., preparing approaches working areas for the movement/operation of cranes and levelling the areas for assembly/erection to ensure effective mechanization on the works. The Contractor shall acquaint himself with availability of access, facilities such as railway siding, local labour etc. and the Contractor may have to build temporary access roads to aid his work and the agreed rates shall be deemed to include the same. It may be noted that all fabrication work shall be carried out in fully mechanized workshops to reduce site fabrication to minimum.

For speedy execution of work, Contractor shall also ensure use of computer software for at least the following:

(i) Billing
(ii) Planning & Scheduling
(iii) Progress Reporting
(iv) Material Control & Warehousing
(v) Safety Records
(vi) Resource Deployment
(vii) Communication

Contractor further agrees that Contract price is inclusive of all the associated costs) which he may incur for actual mobilization, required in respect of use of mechanized construction techniques and that the Owner/Consultant in this regard shall entertain no claim whatsoever.

3.7 Site Organization

The Contractor shall provide all necessary superintendence during the design and execution of the Works and as long thereafter as the Engineer-in-Charge may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. Such superintendence shall be given by sufficient persons having adequate knowledge of the operations to be carried out including the methods and techniques required the hazards likely to be encountered and methods of preventing accident for the satisfactory and safe execution of the Work. The workmen deployed, by the Contractor should also possess the necessary license etc., if required under any law, rules and regulations.

Subject to the provisions in the Contract Document and without prejudice to Contractor's liabilities and responsibilities to provide adequate qualified and skilled personnel on the Work, Contractor shall augment the same as decided by the Engineer-in-Charge depending on the exigencies of Work.

3.7.1 Supervision

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All construction work will be carried out as per direction of EIC, and this will be the primary point of contact between the Contractor and GAIL. on site. All work will be issued and sanctioned through the EIC and site control exercised by site engineers. The Contractor shall ensure that technical quality standards are maintained, that construction is carried out cost effectively and that a good customer and public image is maintained for GAIL.
The Contractor will appoint his own supervisors of minimum number instructed by EIC. These personnel will be responsible to the SE for monitoring construction standards and for ensuring that all detailed technical requirements are met on each and every job which is undertaken. The Contractor's supervisor(s) will have day to day liaison with the SE, and will provide the SE with technical reports and audits, and other management information as is required on work progress and construction quality standards.

The Contractor's supervisor shall have smart mobile phones with internet facility to ensure that they can be contacted & communicated at all times. The Contractor will also nominate one person who can be contacted, if necessary, out of hours, for the duration of the works. The Contractor's supervisor will have access to transport at all times to allow them to visit sites and attend meetings with client/ owner as and when are required. The normal day to day issue of work instructions, communication between GAIL. and the Contractor's supervisor and the SE. No deviation from the approved technical specification / issued construction drawings shall be undertaken without written approval of EIC.
The successful bidder / contractor will as far as possibly engage local workers/manpower in the activities to be undertaken / executed by them for GAIL.

3.8 Health Safety and Environment (HSE) Management

After the award of the contract, detailed Health, Safety and Environment (HSE) program to be followed for execution of contract under various divisions of works will be mutually discussed and agreed between Contractor, Client & consultant.

The Contractor shall establish document and maintain an effective Health, Safety and Environment (HSE) management system. In case contractor fails to follow the instructions of Engineer-in-charge with respect to above clauses, next payment due to him shall not be released unless until he complies with the instructions to the full satisfaction of Engineer-in-charge.

The Contractor shall adhere to the Health, Safety and Environment (HSE) management system as per GAIL Specification and General Conditions of Contract.
It will be the Contractor's responsibility to acquaint his site staff and operatives of all current safety legislation, statutory requirements and GAIL's safety standards/Safety Management system. In addition, and before any work takes place all the Contractor's operatives shall be given training in site safety by the trained person under supervision of GAIL. If the Contractor wishes to start any new operatives on site, he must first inform the SE, who will arrange for such training to be arranged.

3.9 General Guidelines During and Before Erection

3.9.1 The Contractor shall be responsible for organizing the lifting of the structural element, equipment in the proper sequence, that orderly progress of the work is ensured and access routes for erecting the other structures/ equipment are kept open.

GAIL_Internal

3.9.2 During the performance of the work the Contractor at his own cost, shall keep structures, materials and equipment adequately braced by guys, struts or otherwise approved means which shall be Supplied and installed by the Contractor as required till the installation work is satisfactorily completed.
Such guys, shoring, bracing, strutting, planking supports etc. shall not interfere with the work of other agencies and shall not damage or cause distortion to other works executed by him or other agencies.

3.9.3 Manufacturer's recommendations and detailed specifications for the installation of the various equipment and machines shall be fulfilled by the Contractor.

3.9.4 Various tolerances required as marked on the drawings and as per specifications and instructions of the Engineer-in-Charge, shall be maintained.
Verticality shall be maintained. Verticality shall be verified with the Theodolite/advanced instruments.

3.10 Construction Photographs

The Owner desires to have two sets of monthly/weekly progress reports with photographs showing the progress of construction. Before utilizing any photograph for publicity, the Contractor shall obtain prior approval of the Owner.

3.11 Schedule of Labour Rates

Schedule of Labour Rates attached as Annexure-10 to SCC shall be used for analysis rates for extra items.

Schedule of equipment rates attached as Annexure-11 to SCC shall be used for analysis rates for extra items.

3.11.1 Construction Equipment

Minimum construction equipment to be deployed is enclosed as Annexure-8 to SCC. However, any other equipment required for completion of pipeline laying work but not specifically mentioned here, shall be deployed by contractor without any additional cost. The list of equipment mentioned in Annexure-8 is the minimum to be deployed by contractor and contractor shall ensure the availability at site of listed equipment in good working condition.

3.12 Specific Requirements

Specific requirements spelt out in various technical parts of the Bidding Document shall be followed by Contractor.

3.13 Site Cleaning

3.13.1 The BIDDER shall take care for cleaning the working site from time to time for easy access to work site and also from safety point of view.

3.13.2 Working site should be always kept cleaned up to the entire satisfactions of the Engineer-in-charge.

Before handing over and work to owner, the BIDDER in addition to other formalities to be observed as detailed in the document shall clear the site to the entire satisfaction of Engineer-in-charge.

3.14 SURVEY OF WORK

GAIL_Internal

Before the WORK or any part thereof are begun, the Contractor's agent and the Engineer-in-Charge's representative shall together survey the SITE and decide the tentative route considering all obstructions on which the pipeline is to be laid and on which measurements of the WORK are to be based. Such particulars shall be plotted by the BIDDER and trial pits started thereon.
The Contractor shall be entirely responsible for the correctness of every part of the WORK and shall rectify any errors or imperfections therein. Such rectifications shall be carried out by the Contractor at his own cost, when instructions are issued to this effect by the Engineer-in-Charge or his representative. WORK shall be suspended for such times as necessary for checking lines and levels on any part of the WORK.

The Contractor shall at his own expense provide all assistance, which the Engineer-in-Charge may require for checking the setting out to WORKS.
Before commencement of any activity, Contractor's quality control set up duly approved by company must be available at site.

3.15 MANPOWER DEPLOYMENT

3.15.1 Bidder shall meet the requirement regarding deployment of minimum skilled manpower as specified in the bidding document at Annexure-9.

3.15.2 Schedule of Labour & Equipment Rates

Hiring / Recovery Rate for Deployment of Manpower attached as Annexure- 10 to SCC shall be used for analyzing rates for extra items and recovery for non- deployment of manpower.

3.15.3 Equipment Hiring / Recovery Rates attached as Annexure-11 to SCC shall be used for analyzing rates for extra items and recovery for non-deployment of equipment.

3.16 MOBILIZATION OR SHORTFALL IN MOBILISATION OF MINIMUM EQUIPMENT AND MANPOWER.

3.16.1 Contractor shall maintain record of actual mobilization of each equipment and key personnel and offer the same to EIC on fortnightly basis.

3.16.2 If found necessary, GAIL / Consultant may deploy any equipment / manpower and recover the amount for such deployment as per rates provided at Annexure-10 & 11 to SCC respectively.

3.16.3 In case of early mobilization or additional mobilization of equipment as compared to required equipment's to meet the schedule requirement. Contractor shall not be entitled for any extra claim.

3.16.4 Equipment and key personnel may be demobilized by the contractor on completion works at site after written clearance of Engineer-in-charge. Unilateral withdrawal of any equipment / key manpower by the contractor will attract recovery as per the hiring / recovery rates specified in Annexure-10 & 11 to SCC.

3.16.5 A copy of hindrance registers for the specified period (RA bill period) duly signed by contractor, consultant / GAIL shall be maintained and submitted along with each RA bill.

4 PERFORMANCE EVALUATION

The performance of execution by contractor shall be regularly evaluated by GAIL /EIC. The contractors/agencies shall deploy adequate manpower, tools & tackles, machinery, safety equipment and supervisory staff for timely execution of works

Intermittent vendor performance evaluation shall be carried out considering:

- o Execution process,
- o Resource deployment,
- o Quality of work
- o Safety compliance
- o Adherence to committed milestones.

Short closure: In case of non-satisfactory performance or default in any of the above parameters, the contract may be short closed by GAIL without any liability on either side, in order to avoid disruption to project timelines and PNG connection targets.

Also, such defaulting contractors may be restricted from participating subsequent walk In cycles of EOI/award.

5 SUB-SEQUENT ORDERS:

GAIL may award further sub-sequent orders upto Rs 50 lakh on same term and condition, for additional quantities may be awarded to the contractor selected in the walk in methodology without processing new cycle.

The allocation of additional quantities may be considered based on:

a. Satisfactory performance,
b. After confirmation and submission of an undertaking that a separate and independent team/resources shall be deployed for execution of the new job.
c. Compliance with quality and safety requirements.
d. Completion of at-least 80% of the job awarded.

In case of a subsequent award to the same contractor while the previous contract is still in progress, the contractor shall deploy a separate team for execution of the new work and shall submit an undertaking to this effect. However, subsequent award shall be sole prerogative of GAIL and same shall be exercised as per the requirements.

6. **PAYMENT OF INCENTIVE TO PLUMBERS:**

GAIL may pay some incentive to plumbers deployed by the contractor under the contract based on the performance of work by plumber as certified by EIC.

6.1 Incentive to plumbers shall be admissible only against actual new completed PNG connections and payment shall be made directly to plumbers.

6.2 The payment of incentive is sole prerogative of GAIL without any contractual obligation.

7. **TESTS, INSPECTION AND COMPLETION**

7.1 Tests and Inspection of Material under Contractor's Scope

Inspection and test prior to shipment of material and at final acceptance shall be as specified in Technical Specification. However, without prejudice to the provision of Technical Specification following shall hold good.

The Owner/Consultant or its representative shall have the right to inspect ad or to test the material to conform their conformity to the specification.

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If any inspected or tested material fail to conform the specification, the Owner/Consultant may reject them and the contractor shall either replace the rejected materials or make all the alteration necessary to meet the specification, free of cost to the purchaser/consultant.

The Purchaser / Consultant's right to inspect, test and where ever necessary reject the material after the material's arrival in the purchaser / consultant site shall in no way be limited to or waived by reason of the material having previously been inspected, tested and passed by the purchaser/ Consultant or their representative prior to the material shipment from the material supplier.

7.2 Tests and Inspection during execution

The Contractor shall carry out the various tests as enumerated in the technical specifications of this Bidding Document and technical documents that will be furnished to him during the performance of the work at no extra cost to the Owner.

All the tests either on the field or at outside laboratories concerning the execution of the work and supply of materials by the Contractor shall be carried out by Contractor at his own cost.
The work is subject to inspection at all times by the Engineer-in-Charge. The Contractor shall follow all instructions given during inspection and shall ensure that the work is being carried out according to the technical specifications of this Bidding Document, the technical documents that will be furnished to him during performance of work and the relevant codes of practice.

The Contractor shall provide for purposes of inspection access ladders, lighting equipment for testing, necessary instruments etc. at his own cost, low voltage lighting equipment for tray fixing and inspection work.
Compressed air for carrying out works shall be arranged by the Contractor at his own cost.

For material supplied by Owner, Contractor shall carry out the tests, if required by the Engineer-in-Charge, and the cost of such tests shall be reimbursed by the Owner at actual to the Contractor on production of documentary evidence.

Contractor shall inspect carefully all equipment before receiving them from Owner for installation purposes. Any damage or defect noticed shall be brought to the notice of Engineer-in- Charge immediately.
All results of inspection and tests will be recorded in the inspection reports, proforma of which will be approved by the Engineer-in-Charge. These reports shall form part of the completion documents. Any work not conforming to execution drawings, specifications or codes shall be rejected and the Contractor shall carryout the rectifications at his own cost.

Inspection and acceptance of the work shall not relieve the Contractor from any of his responsibilities under this Contract.

7.3 Final Inspection during execution

After completion of all tests as per specification the whole work will be subject to a final inspection to ensure that job has been completed as per requirement. If any defect is noticed, the Contractor will be notified by the Engineer-in-Charge and he shall make good the defects at his own cost and risk with utmost speed. If, however, the Contractor fails to attend to these defects within a reasonable time (time period shall be fixed by the Engineer-in-Charge) then Engineer-in-Charge may have defects rectified at Contractor's cost.

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When these works are carried out at the risk and cost of the Contractor, the Engineer-in-charge would recover the actual cost incurred towards labour, supervisions and material, consumables or otherwise, plus 100% towards overheads from any pending bill of the Contractor or the security deposit.

7.4 **Documentation**

7.4.1 As- Built Drawings

Notwithstanding the provisions contained in standard specifications, upon completion of commissioning, the BIDDER shall complete all of the related approved drawings along with bill of materials to the "AS BUILT" stage provide to a scale of 1:200 and submit to GAIL, the following:

a) One complete set in reduced size (279 mm x 432 mm).
b) One complete set of Soft Copy in CD of all original drawings.
c) Four complete sets of approved prints in A2 / A3 sizes.

7.4.2 Completion Document

The following documents shall be submitted in hard binder by the BIDDER in FOUR sets, as a part of completion documents: -

a) Copies of the Inspection reports, Laying Graphs, HDD Profiles (IF ANY) and valve pit drawings (IF ANY).
b) Pre testing, final Hydrostatic / pneumatic and other Test results and reports.
c) Consumption statements of PE / GI certified by Owner's Site Engineer.
d) Final Material Reconciliation, stores issue & return statements
e) All other requirements as specified in the respective specifications.
f) Completion Certificate issued by Owner's Site Engineer.
g) No claim certificate by the BIDDER.
h) Completion certificate for embedded and covered up works wherever applicable.
i) Recovery statement, if any.
j) Deviation statement.
k) Statement for reconciliation of all the payments and recoveries made in the progress bills.
l) Copies of deviation statement and order of extension of time, if granted.
m) Any other contractual documents required on completion.
n) Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given / completed.
o) The details recorded in measurement cards of every domestic house.
p) Details of houses where extra piping done along with materials used.
q) Total material consumption report.
r) Material reconciliation with respect to the materials issued.
s) Test reports & test certificates of gauges etc.
t) Any other documents / records required.

7.5 Statement of Final Bills-Issue of No Demand Certificate

The final bill of Contractor shall be accompanied by no-demand certificate from the following departments of the Owner:

a) Administration & Personnel Department regarding vacation of land, housing accommodation, recovery of tents etc.

b) Fire and Safety Officer and CISF. (IF REQUIRED)

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The Contractor shall obtain such no-demand certificates from the concerned authorities and furnish the same to the Engineer-in-Charge.

7.6 Issue and Reconciliation of Material

Refer Annexure-7 to SCC for details.

8. LIMITATION OF LIABILITY

"Clause no. 80.3 of GCC-Works is modified to the following extent:

Following shall stand appended to clause no. 80.3 of GCC-Works:
The final payment by the Employer in pursuance of the Contract terms shall not mean release of the Contractor from all of his liabilities under the Contract. The Contractor shall be liable and committed under this contract to fulfil all his liabilities and responsibilities, till the time of release of contract performance guarantee by the Employer.

9. CONTRACT PERFORMANCE GUARANTEE

After issuance of the Contract/FOA, the successful bidder shall furnish Contract Performance Security (CPS) equivalent to 10% of the awarded Contract Value (excluding GST). The bidder can submit CPS for 10% of the total awarded value (excluding GST).

OR

Initially, the bidder shall submit an Initial Security Deposit (ISD) equivalent to 2.5% of the awarded Contract Value (excluding GST) in the form of DD/IMPS/NEFT/RTGS within fifteen (15) days from the date of issuance of the Contract/FOA, as per the details provided below. Submission of the CPS in any other form, such as Bank Guarantee (BG), Surety Bond, Fixed Deposit Receipt (FDR), or any other instrument, shall not be accepted.

The balance 7.5% shall be recovered through deductions from the Running Account (RA) Bills until the total Security Deposit, including the ISD and deductions from RA Bills, reaches 10% of the awarded Contract Value (excluding GST).

Documentary evidence of CPS/ISD submission or payment shall be furnished to the respective GA EIC/responsible official(s), as instructed by GAIL. The CPS amount shall be released as per the terms and conditions mentioned in GAIL GCC for works.

a. The Contract Performance Security (CPS)/Security Deposit (SD) will be for a period of 90 days beyond the contract period/ duration and applicable Warranty/ Guarantee /Defect Liability Period (if any).

b. Contract Performance Security (CPS) is to be submitted by bidder within 15 days after issuance of Fax of Acceptance (notification of Award) and in event of delay in submission of CPS, the contract can be terminated.

c. In case, GAIL allows additional time for submission of CPS beyond 30 days, a penal interest of Marginal Cost of Fund based Lending Rate (MCLR) for one year charged by SBI (applicable on due date of submission of CPS i.e. 30th day after issuance of FOA/Notification of award) plus 4.0% per annum (on CPS amount) shall be charged for delay beyond 30 days i.e. from 31st days after issuance of FOA.

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d. The Contract Performance Security (CPS) shall be submitted only in the in the form of DD/IMPS/NEFT/RTGS. Submission of the CPS in any other form, such as Bank Guarantee (BG), Surety Bond, Fixed Deposit Receipt (FDR), or any other instrument, shall not be accepted.

10. SUBSEQUENT LEGISLATION

10.1 All duties, taxes (including trade tax/ turnover tax/GST as applicable), fees, charges, expenses, etc. (except where otherwise expressly provided in the Contract) as may be levied/ imposed in consequence of execution of the works or in relation thereto or in connection therewith as per the Acts, Laws, Rules, Regulations in force shall be to Contractor's account. However, any new taxes /duties imposed after the date of submission of last price bid & up to Contractual Completion date shall be to the GAIL's account but such Taxes /duties imposed beyond Contractual Completion date shall be to the Contractor's account. However, if such new taxes etc. is in substitute of existing taxes, same will be considered on merit of each case.

11 ISSUE OF CERTIFICATE- PERTAINING TO IMPORT

GAIL shall not provide any kind of certificate in this regard.

12 IMPORT LICENCE

12.1 Contractor shall arrange import of all materials required for permanent incorporation in the works as well as construction equipment as per the guidelines laid down by the Government of India. Employer shall not provide import license.

13 INTELLECTUAL PROPERTY

13.1 Neither Employer nor Contractor nor their personnel, agents nor any sub-contractor shall divulge to any one (other than persons designated by the party disclosing the information) any information designated in writing as confidential and obtained from the disclosing party during the course of execution of the works so long as and to the extent that the information has not become part of the public domain. This obligation does not apply to information furnished or made known to the recipient of the information without restriction as to its use by third parties or which was in recipient's possession at the time of disclosure by the disclosing party. Upon completion of the works or in the event of termination pursuant to the provisions of the contract, Contractor shall immediately return to Employer/Consultant all drawings, plans, specifications and other documents supplied to the Contractor by or on behalf of Employer/Consultant or prepared by the Contractor solely for the purpose of the performance of the works, including all copies made thereof by the Contractor.

14. FIRM PRICE

14.1 The awarded prices shall be firm and shall not subject to price escalation till the work is completed in all respects.

15. WORKS CONTRACT

15.1 The work covered under this contract shall be treated as "Works Contract".

16. PROVIDENT FUND ACT

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16.1 The Contractor shall strictly comply with the provisions of Employees Provident Fund Act and register themselves with RPFC before commencing work. The Contractor shall deposit Employees and Employers contributions to the RPFC every month. The Contractor shall furnish along with each running bill, the challan/ receipt for the payment made to the RPFC for the preceding months.

17. TERMS OF PAYMENT

17.1 Basis and terms of payment for making "On Account Payment" shall be as set out in Annexure-5 to SCC.

18. COORDINATION WITH OTHER AGENCIES

18.1 Work shall be carried out in such a manner that the work of other agencies operating at the site is not hampered due to any action of the Contractor. Proper coordination with other agencies will be Contractor's responsibility. In case of any dispute, the decision of Engineer-in-Charge shall be final and binding on the Contractor.

19. SINGLE POINT RESPONSIBILITY

The entire work as per scope of work covered under this contract (to be awarded to any bidder as per evaluation methodology) shall be awarded on single point responsibility basis.

20. ROYALTY

20.1 Contractor's accepted rate should include the royalty on different applicable items as per the prevailing Government rates. In case, Employer is able to obtain the exemption of Royalty from the State Government, the contractor shall pass on the same to Employer for all the items involving Royalty.

21. THE FACILITIES FOR WORKMEN

21.1 Following facilities are to be ensured at all work places where workmen are deployed/ engaged by Contractor & any other, as required by law at the time of execution.

- Arrangement of first aid
- Arrangement for clean drinking water.
- Toilets
- Canteen where tea & snacks are available
- A crèche where 10 or more women workmen are having children below the age of 6 years.

22 ARBITRATION

All issue(s)/dispute(s) excluding the matters that have been specified as excepted matters and listed at clause no. 2.6 and which cannot be resolved through Conciliation, such issue(s)/dispute(s) shall be referred to arbitration for adjudication by Sole Arbitrator.

The party invoking the Arbitration shall have the option to either opt for Ad-hoc Arbitration as provided at Clause 2.1 below or Institutionalized Arbitration as provided at Clause 2.2 below, the remaining clauses from 2.3 to 2.7 shall apply to both Ad-hoc and Institutional Arbitration:-

2.1 On invocation of the Arbitration clause by either party, GAIL shall suggest a panel of three independent and distinguished persons (Retd Supreme Court & High Court Judges only) to the other party from the Panel of Arbitrators maintained by 'Delhi International Arbitration Centre (DIAC) to select any one among them to act as the Sole Arbitrator.

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In the event of failure of the other party to select the Sole Arbitrator within 30 days from the receipt of the communication from GAIL suggesting the panel of arbitrators, the right of selection of the sole arbitrator by the other party shall stand forfeited and GAIL shall appoint the Sole Arbitrator from the suggested panel of three Arbitrators for adjudication of dispute(s). The decision of GAIL on the appointment of the sole arbitrator shall be final and binding on the other party. The fees payable to Sole Arbitrator shall be governed by the fee Schedule of ''Delhi International Arbitration Centre'.

OR

2.2 If a dispute arises out of or in connection with this contract, the party invoking the Arbitration shall submit that dispute to any one of the Arbitral Institutions i.e ICADR/ICA/DIAC/SFCA and that dispute shall be adjudicated in accordance with their respective Arbitration Rules. The matter shall be adjudicated by a Sole Arbitrator who shall necessarily be a Retd Supreme Court/High Court Judge to be appointed/nominated by the respective institution. The cost/expenses pertaining to the said Arbitration shall also be governed in accordance with the Rules of the respective Arbitral Institution. The decision of the party invoking the Arbitration for reference of dispute to a specific Arbitral institution for adjudication of that dispute shall be final and binding on both the parties and shall not be subject to any change thereafter. The institution once selected at the time of invocation of dispute shall remain unchanged.

2.3 The cost of arbitration proceedings shall be shared equally by the parties.

2.4 The Arbitration proceedings shall be in English language and the seat, venue and place of Arbitration shall be New Delhi, India only.

2.5 Subject to the above, the provisions of Arbitration & Conciliation Act 1996 and any amendment thereof shall be applicable. All matter relating to this Contract and arising out of invocation of Arbitration clause are subject to the exclusive jurisdiction of the Court(s) situated at New Delhi.

2.6 List of Excepted matters:

a) Dispute(s)/issue(s) involving claims below Rs 25 lakhs and above Rs 25 crores.
b) Dispute(s)/issue(s) relating to indulgence of Contractor/Vendor/Bidder in corrupt/fraudulent/collusive/coercive practices and/or the same is under investigation by CBI or Vigilance or any other investigating agency or Government.
c) Dispute(s)/issue(s) wherein the decision of Engineer-In-Charge/owner/GAIL has been made final and binding in terms of the Contract.

2.7. Disputes involving claims below Rs 25 Lakhs and above Rs. 25 crores:- Parties mutually agree that dispute(s)/issue(s) involving claims below Rs 25 Lakhs and above Rs 25 crores shall not be subject matter of Arbitration and are subject to the exclusive jurisdiction of the Court(s) situated at New Delhi.

3. **GOVERNING LAW AND JURISDICTION**:

The Contract shall be governed by and construed in accordance with the laws in force in India. The Parties hereby submit to the exclusive jurisdiction of the Courts situated

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at New Delhi for adjudication of disputes, injunctive reliefs, actions and proceedings, if any, arising out of this Contract.

23. PROJECT PLANNING, SCHEDULING AND MONITORING SYSTEM

23.1 The Contractor shall follow the specifications with respect to Project Planning, Scheduling and Monitoring system as giving in Bidding Document.

24. CHECKING OF LEVELS

24.1 The Contractor shall be responsible for checking levels, orientation plan of all foundations, foundation bolts, etc., well in advance of taking up the actual erection work and bring to the notice of Engineer-in-Charge discrepancies, if any. In case of minor variations in levels etc. the Contractor shall carry out the necessary rectifications to the foundations within his accepted price.

24.2 The Contractor shall also be responsible for checking with templates, wherever necessary, the disposition of foundation bolts with the corresponding bases of structure and shall effect rectifications, as directed, within his accepted rate.

25. STORAGE FACILITIES

25.1 The Contractor shall maintain wherever required an air-conditioned room for the storage of the instruments as well as for calibration and testing of the instruments at his own cost. The contractor shall provide these facilities within the accepted price.

26 BUILDING AND OTHER CONSTRUCTION WORKER'S ACT

In order to govern welfare and working conditions of labourers engaged in construction activities, the Building and other Construction Workers' (Regulation of Employment and Conditions of Service "RE &CS") Act, 1996 came into force. RE&CS Act'1996 is applicable in respect of building and other construction work. Wherever applicable, The CONTRACTOR shall strictly comply with the following provisions pertaining to RE &CS Act'1996.

a) The CONTRACTOR must be registered with the concerned authorities under the Building and Other Construction Workers' (RE&CS) Act, 1996 or in case of non-registration; the CONTRACTOR should obtain registration within one month of the award of contract.

b) The CONTRACTOR shall be responsible to comply with all provisions of the Building and Other Construction Workers' (RE&CS) Act, 1996, the Building and Other Construction Workers' Welfare Cess Act, 1996, the Building and other Construction Workers' (RE&CS) Rules, 1998 and the Building and Other Construction Workers Welfare Cess Rules, 1998.

c) Cess as per the prevailing rate, shall be deducted at source from bills of the CONTRACTOR by the engineer-in-Charge of the contract and remitted to the "Secretary, Building and Other Construction Workers Welfare Board" of the concerned State. The CONTRACTOR shall be responsible to submit final assessment return of the cess amount to the assessing officer after adjusting the cess deducted at source.

27. ORDER PLACEMENT OF BOUGHT OUT ITEMS

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The contractor is required to place firm order for all bought out items of adequate quantity (including 1st lot in those cases where items are required to be procured in more than one lot, if so stated in SOR/ SCC) within 30 days from the date of placement of order, failing which owner reserves the right to procure the same at the risk & cost of the contractor. However, the contractor shall always take prior approval of owner and consultant for items required to be procured.

Further lots (for those cases where items are required to be procured in more than one lot, if so, stated in SOR/ SCC) shall be procured after suitable period so as to ensure adequate availability of material at site throughout the execution period).

28. REQUIREMENTS FOR CONTRACTOR AT SITE

28.1 Contractor shall establish site office in the respective areas with adequate facilities like tables, chairs, telephone, and computer with mailing facility etc. for effective communication and documentation.

28.2 Contractor shall provide as and when required a wagon(s) suitable for soil removal, for the delivery or reinstatement materials and for the transport of pipe to and from site.

28.3 Contractor shall supply transport for their technical staff and operatives to move from site to site, and to move tools and equipment from site to site, this vehicle will also be fitted with a tow bar suitable for the towing of a mobile air compressor or pipe trailer.

28.4 Contractor shall make appropriate arrangements to ensure that their supervisor(s) are adequately mobile and can attend sites or meeting with GAIL / Consultant & other authorities or customers as required, without any undue delay.

28.5 Contractors shall provide cell phones to their supervisors for day-to-day communication with GAIL / consultant and site representatives of GAIL / Consultant.

28.6 Owner will not allow switching/ swapping of key personnel of any contractor working at site from one contractor to another during the continuity of the contract.

29. COMPLIANCE WITH LAWS

29.1 The Contractor shall abide by all applicable rules, regulations, statutes, laws governing the performance of works in India, including but not limited to the following:

a) Contract Labour (Regulation & Abolition) Act 1970 & the centre rules, 1971 framed there under.
b) Payment of Wages Act.
c) Minimum Wages Act.
d) Employer's Liability Act.
e) Factory Act.
f) Apprentices Act.
g) Workman's Compensation Act.
h) Industrial Dispute Act.
i) Environment Protection Act.
j) Wild life Act.
k) Maritime Act.
l) Any other Statute, Act, Law as may be applicable.
m) PNGRB Act.

30. NOTES TO SCHEDULE OF RATES (SOR)

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a) The SOR items would be operatable as per job requirement.

b) The quantities stated in SOR are tentative and may vary considerably on ± side depending upon site condition, methodology adopted as per site requirement. The payment will be made as per actual certified Measurement at site and as instructed by EIC.

c) The scope as mentioned in the SOR is of indicative nature only and shall include all activities as detailed in the relevant clauses of the specifications attached and other relevant documents enclosed with bid.

d) Any other materials & activities not mentioned/covered in SOR, but otherwise required for satisfactory completion/safety of work as defined in tender/bid has to be supplied /done by contractor with in the specified schedule at no extra cost to owner.

e) Contractor shall be required to deploy adequate no. of plumbing teams to ensure domestic conversions expeditiously. In this regard, no. of independent teams shall be decided by Engineer-in-charge.

f) Efforts shall be made to offer complete work front in nearby areas based on availability. However, it is to be noted that offered the work front may be at different locations (which may not be near to each other) in staggered basis across the GA. Bidder to understand to execute the required work at various locations and be prepared as per the allotted fronts at scattered locations across the GA.

31. **INSURANCE**

All kind of Insurances including transit Insurance shall be borne & arranged by the bidder in line with clause no. 101 of GCC-Works. SOR price shall be inclusive of this cost.

32. **PRICE REDUCTION SCHEDULE (PRS)-** Not Applicable

33. **SUB-LETTING OF WORKS-** Not applicable

34. **BONUS FOR EARLY COMPLETION-** Not Applicable

35. **JOINTS MEASUREMENT OF WORK EXECUTED, BILLING, INVOICE AND PAYMENTS**.

Measurement shall be recorded as per the methods of measurement spelt out in Specification/Contract Documents/ Procedure of GAIL.

36. **WAY BILL / ROAD PERMIT**

Shall be issued by Owner only for transportation of free issue material from one state to another.

37. **LOCAL EMPLOYMENT**

In order to encourage local employment, contractor shall endeavor to deploy personnel pass-out from local institutes including execution of non-critical activities through local agencies. However, preference should be given to engage more unskilled manpower resources locally to boost local employment.

38. **COMPLETION CERTIFICATE**

AS PER GCC.

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39 **PRADHAN MANTRI SURAKSHA BIMA YOJANA (PMSBY) AND PRADHAN MANTRI JEEVAN JYOTI BIMA YOJANA (PMJJBY)**

Contractor shall ensure that all its personnel deployed under this contract have obtained additional insurance coverage under the Pradhan Mantri Suraksha Bima Yojana (PMSBY) and Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) through the participating banks and submit the proof of such insurance coverage to the satisfaction of GAIL. The cost of the insurance premium amount for both the above schemes shall be borne by the contractor giving evidence/proof to GAIL in this respect and the Contractor shall suitably consider the same in their bid.
Both the schemes are to be regulated continuously on yearly basis and the same should be renewed on each successive relevant date in subsequent years.

40. **PLANNING AND DESIGNING IN PURVIEW OF VULNERABILITY ATLAS OF INDIA**

The following provision shall be considered as a part of General Conditions of Contract-Works:
Vulnerability Atlas of India (VAI) is a comprehensive document which provides existing hazard scenario for the entire country and presents the digitized State/UT- wise hazard, maps with respect to earthquakes, winds and floods for district-wise identification of vulnerable areas. It also includes additional digitized maps for thunderstorms, cyclones and landslides. The main purpose of this Atlas is its use for disaster preparedness and mitigation at policy planning and project formulation stage.
This atlas is one of its kind single point source for the various stakeholders including policy makers, administrators, municipal commissioners, urban managers, engineers, architects, planners, public etc. to ascertain proneness of any city/location/site to multi-hazard which includes earthquakes, winds, floods thunderstorms, cyclones and landslides. While project formulation, approvals and implementation of various urban housing, buildings and infrastructures schemes, this Atlas provides necessary information for risk analysis and hazard assessment.

The Vulnerability Atlas of India has been prepared by Building Materials and Technology Promotion Council under Ministry of Housing and Urban Affairs, Government of India and available at their website www.bmtpc.org.It is mandatory for the bidders to refer Vulnerability Atlas of India for multi-hazard risk assessment and include the relevant hazard proneness specific to project location while planning and designing the project in terms of.

a. Seismic zone (II to V) for earthquakes,
b. Wind velocity (Basic Wind Velocity:55,50,47,44,39&33m/s)
c. A reliable to floods and Probable max, surge height
d. Thunder storms history
e. Number of cyclonic storms/ severe cyclonic storms and max sustained wind specific to coastal region
f. Landslides incidences with Annual rainfall normal
g. District wise Probable Max. Precipitation.

41. The contractor fully understands that timely completion of the work as per the schedule is of paramount necessity as otherwise it would lead to adversely affecting the schedules of other works/project with resultant financial and other losses to the owner. In view of this, the contractor unconditionally agrees and binds himself to be liable for all the consequences for unsatisfactory performance and non-completion of the work within the stipulated time.

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ANNEXURES TO SCC

C O N T E N T S

Annexure-1	:	Scope of Work
Annexure-2	:	Scope of Supply
Annexure-3	:	Time Schedule
Annexure-4	:	Measurement of Work
Annexure-5	:	Terms of Payment
Annexure-6	:	Quality Assurance
Annexure-7	:	Conditions for issue & reconciliation of material
Annexure-8	:	Construction equipment to be deployed
Annexure-9	:	Minimum no. of skilled manpower to be deployed
Annexure-10	:	Schedule of Labour Rate
Annexure-11	:	Schedule of Equipment Hourly Rental Rate

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SCOPE OF WORK

(ANNEXURE-1 TO SPECIAL CONDITIONS OF CONTRACT)

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ANNEXURE-1 TO SCC

1.0 SCOPE OF WORK

Scope of work shall be as detailed in Particular Job Specification, Technical Specifications, Schedule of Rates & various other parts of this Bidding Document.

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SCOPE OF SUPPLY

(ANNEXURE-2 TO SPECIAL CONDITIONS OF CONTRACT)

GAIL_Internal

ANNEXURE-2 TO SCC

1.0 SCOPE OF SUPPLY

1.1 Owner's Scope of Supply (Free Issue Item)

Owner's scope of supply shall be as specified in Particular Job Specification, Technical specifications, Schedule of Rates & various other parts of the Bidding Document.

In order to speed up the project Free Issue Materials on replacement basis shall be issued to the Contractor from the designated store(s) of GAIL (I) Ltd. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

Conditions for Issue and Reconciliation of Materials shall be as per Document enclosed as

Annexure-7 to Special Conditions of Contract.

1.2 Contractor's Scope of Supply

All materials except what is under Owner's scope of supply as mentioned in Clause No. 1.1 above, and required for successful completion of works in all respects shall be supplied by the Contractor and the cost of such supply shall be deemed to have been included in the accepted price without any additional liability on the part of Owner.

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TIME SCHEDULE

(ANNEXURE-3 TO SPECIAL CONDITIONS OF CONTRACT)

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ANNEXURE-3 TO SCC

TIME SCHEDULE

Validity of the contract shall be as below.

Name of Work	Scope of work	Time of Completion
PE Laying and associated works for City Gas Distribution.	For Contract value up to 25 Lakhs	To be completed within 60 days from the date issuance of FOA.
	For Contract value up to 50 Lakhs	To be completed within 90 days from the date issuance of FOA.

Note:

1) The above time schedule is inclusive of mobilization period of 07 days.

2) The time indicated is for completing all the works in all respects as per specifications, codes, drawings and instructions of Engineer-in-charge.

3) It is to be noted that the completion period of complete scope of works mentioned above and/or in tender/bid document includes preparation of drawings (if required), procurement and supply of materials including their inspection & testing, mobilization at site, construction, laying/ installation, fabrication, erection, testing, inspection, testing, rectification (if any), pre-commissioning, commissioning and demobilization works etc. complete in all respects to the entire satisfaction of Owner/ Engineer-in- charge.

4) Performance shall be evaluated based on pro rata achievements in line with above schedules through intermittent vendor evaluation process.

5) In case work could not be completed in above stated period for reasons solely attributable to owner, suitable time extension shall be given. Successful bidder(s) shall be bound to carry out the work at same rates, terms & conditions within the extension granted.

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MEASUREMENT OF WORK
(ANNEXURE-4 TO SPECIAL CONDITIONS OF CONTRACT)

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ANNEXURE-4 TO SCC

MEASUREMENT OF WORK

1.0 GENERAL

1.1 The mode of measurement shall be as mentioned in relevant standard specification incorporated in the Bidding Document. Any other mode of measurements not covered in above specifications shall be followed in accordance with relevant BIS codes/ Schedule of Rates/ Specifications etc. and/ or as decided by Engineer-in-charge.

1.2 Payment will be made on the basis of joint measurements taken by Contractor and certified by CMC/Site Consultant Engineer. Measurement shall be based on "Approved for Construction" drawings, to be the extent that the work conforms to the drawings and details are adequate. 3-5% checking of measurement work shall be by GAIL engineer.

1.3 Payment will be made on the basis of joint measurements taken by Contractor and certified by CMC Engineer. Measurement shall be based on "Approved for Construction" drawings, to be the extent that the work conforms to the drawings and details are adequate. 3-5% checking of measurement work shall be by GAIL (I) engineer.

1.4 Wherever work is executed based on instructions of Engineer-in-charge or details are not adequate in the drawings, physical measurements shall be taken by Contractor in the presence of Engineer-in-charge.

1.5 Measurements of weights shall be in metric tonnes corrected to the nearest Kilogram. Linear measurements shall be in meters corrected to the nearest centimeters.

1.6 The weights mentioned in the drawing or shipping list shall be the basis for payment. If mountings for panels etc. are packed separately, their erection weights shall include all mountings.

1.7 Welds, bolts, nuts, washers etc. shall not be measured. Rates for structural steel work shall be deemed to include the same.

1.8 No other payment either for temporary works connected with this Contractor for any other item such as weld, shims, packing plates etc. shall be made. Such items shall be deemed to have been included for in the rates accepted.

1.9 Measurement will be made for various items under schedule of rates on the following basis as indicated in the unit column.

i) Weight : MT or Kg
ii) Length : M (Meter)
iii) Number : No.
iv) Volume : Cu.M
v) Area : Sq.M

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2.1 **PIPING**

2.2 Length of pipes shall be measured along the curvilinear center of the pipelines laid/ installed and shall include all types of fittings, bends etc. but excluding all types of valves. Length of valves shall be excluded from piping measurement and shall be considered on number basis.

3.0 **FOR PIPELINE CROSSINGS BY HDD (if required) / BORING / MOLING METHOD**

Payment shall be made as specified in SOR, PJS and Technical Specification.

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TERMS OF PAYMENT

(ANNEXURE-5 TO SPECIAL CONDITIONS OF CONTRACT)

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ANNEXURE-5 TO SCC

1. TERMS OF PAYMENT

Pending completion of the whole works, provisional progressive payments for the part of work executed by the contractor shall be made by Owner on the basis of said work completed and certified by the Owner's representative as per the agreed milestone payment schedule and the percentage break-ups given below.

Each invoice will be supported by documentation acceptable to Owner and certified by the Owner's representative. Payments made by owner to the contractor for any part of the work shall not deem that the Owner has accepted the work.

The Contractor shall submit the invoice at a minimum interval of 15 (fifteen) days, provided that the value of work executed is at least 20% of the awarded contract value.

2. No mobilization advance is permissible.
3. Milestone Payment breakup:
   a) Laying, jointing, testing, pre-commissioning, and commissioning of PE pipelines by any method in any type of strata.

70%	In continuous stretches including trench less laying or total scope whichever is less after completion of trenching, lowering, electro-fusion jointing of pipeline, back-filling and compaction for the complete stretch as per the scope of work. Testing of network, installation of Permanent Markers & Valve chambers and restoration of pits.
25%	After commissioning with Natural Gas. If natural gas is not available and the delay is attributable to the Owner then commissioning to be done with Nitrogen after 10 days from the date of Testing.
5%	Submission of all documents of complete network, Final Bill & Closure of contract.

   b) Restoration work

80%	After Civil works/ Cutting/ Breaking and complete Restoration area wise as per the standards (bidder may note that restoration work shall be carried out after successful laying & testing in respective area).
15%	After 90 days of GAS charging of pipe/obtaining NOC from respective local authorities / Third party agencies designated by land owning agencies whichever is earlier.
5%	After Completion of all works and closure of contract.

   c) Supply 'and /or' installation of "sleeves, valves, Valve pit, markers, Equipment, transition fittings, civil work (other than restoration work), fencing work, crossing of sewage drains/ nala.

80%	Upon supply and Complete installation of item's and all its associated work.
15%	After commissioning.
5%	After submission of documents and closure of contract.

   d) Commercial and service regulator connection, installation of regulator, regulator box and meter, supply and installation of isolation valves.

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75%	After Completion of installation of pipes including all fittings, valves, Meter, Regulator etc. and clamping/support. Testing of installations (case decided by EIC).
20%	After commissioning with Natural Gas. If natural gas is not available and the delay is attributable to the Owner then with Nitrogen after 10 days from the date of Testing. Submission of As-built/Isometric drawings.
5%	After submission of documents and closure of contract.

e) GPR survey, preservation of pipeline, Liaisoning Work, flushing and testing of existing line.

95%	After completion of the work in all respects.
5%	After submission of documents and closure of contract.

Note:

a. **Any further breakup of each activity for the payment purpose can be done depending upon the site situation / requirement and recommendation by EIC and approval of construction in-charge.**

b. Notes for SOR Items for valve pit: For the payment of changed size of valve pit other than SOR item due to site requirements, the following to be adopted.

1. In case of any change in size of valve pit, the following shall be adopted for proportionate payment at the accepted rates for reduced or increased dimensions than sizes specified in item the quantity shall be arrived proportionately based on the actual perimeter constructed and specified perimeter of items

4. Payment Methodology

A. The contractor shall raise invoices and shall enclose all documents as per check list issued by CMC/ Owner during kick off meeting or later. All the RA bills are to be submitted to EIC (Consultant/ GAIL).

B. The bidder shall submit the initial Contract Performance Security (CPS), Contract Agreement, and all other documents specified in the EOI before submitting any RA bill to GAIL (I) LTD.

C. Employer will release payment through e-payments only as detailed in the Bidding Document.

D. Further break-up of Lumpsum Prices, if deemed necessary for any progressive payment of individual item may be mutually arrived at between Engineer-in-Charge and the Contractor.

E. All payments against running bills are advance against the work and shall not be taken as final acceptance of work / measurement carried out till the final bill.

F. The Contractor shall be responsible to submit the invoices to EIC or designated person in GAIL for measurement certification and bills shall be processed through VIM based on certification by SIC/CIC.

G. The contractor shall submit RA bills in prescribed pro-forma. Following documents are to be provided along with Measurement Book & Abstract of Measurement.

H. Measurement sheets duly verified and certified by EIC, in support of the works executed as per SOR for the billing period along with below documents.

I. Copy of PF remittance challan.
II. Copy of ESIC remittance.
III. Copy of Wage register.
IV. Two sets of Construction Photographs

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I. In the absence of the requisite documents, the Measurement Book / Abstract of Measurement shall be returned to the contractor.
J. Successful bidder(s) to submit material reconciliation certificate along with each bill.
K. Bills shall be raised by contractor in line with check list attached in Tender/bid document.
L. As per CBDT Notification No. 95/2015 dated 30.12.2015, mentioning of PAN no. is mandatory for procurement of goods / services/works/consultancy services exceeding Rs. 2 Lacs per transaction.

Accordingly, supplier/ contractor/ service provider/ consultant should mention their PAN no. in their invoice/ bill for any transaction exceeding Rs. 2 lakhs. As provided in the notification, in case supplier/ contractor/ service provider/ consultant do not have PAN no., they have to submit declaration in Form 60 along with invoice/ bill for each transaction.

Payment of supplier/ contractor / service provider/ consultant shall be processed only after fulfilment of above requirement.

5. E-Payment

I. GAIL has initiated payments to Contractors electronically, and facilitate the payments electronically through 'e-banking'.
II. GAIL Limited has implemented Vendor Invoice Management (VIM) system titled as #SARATHI# for automation, digitization & centralization of Account Payable process.
III. Supplier/ Contractor/Service Provide/ Consultant is required to upload digital invoice on 'Sparsh' portal. The system optimizes and simplifies the process of receiving, managing, monitoring and forwarding invoices for payment process. The link of 'Sparsh' portal is as under:
IV. https://sparsh.gail.co.in/flipper/#/login
V. The 'Help Manual' hyperlink to access the detailed User Manual, Demo Videos, FAQ#s and other relevant information is available on 'Sparsh' portal.
VI. Only digital invoice is to be uploaded on 'Sparsh' portal and all other supporting documents along with copy of invoice are to submitted to concerned as defined in Purchase Order (PO)/ Letter of Acceptance (LOA).

Note:

a) Up to 75% of admissible payment against certified works may be released at the sole discretion of GAIL within seven (07) days of submission of invoice based on certification by EIC & SIC/CIS.
b) Balance payment shall be released after submission and verification of complete supporting documents.

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QUALITY ASSURANCE

(ANNEXURE-6 TO SPECIAL CONDITIONS OF CONTRACT)

(For details- Refer our Technical Specification No. BR/QA/001 of the same is enclosed in Vol.-II of bid document.)

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CONDITIONS FOR ISSUE AND RECONCILIATION OF MATERIAL

(ANNEXURE-7 TO SPECIAL CONDITIONS OF CONTRACT)

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ANNEXURE-7 TO SCC

1.1 CONDITIONS FOR ISSUE OF MATERIALS

Whenever any material is issued by Owner, following conditions for issue of material in addition to other conditions specified in the contract shall be applicable.

1.2 Necessary indents will have to be raised by the Contractor as per procedure laid down by the Engineer-in-charge from time to time, when he requires the above material for incorporation in permanent works.

1.3 Materials will be issued only for permanent works and not for temporary works, enabling works etc. unless specifically approved by the Engineer-in-charge and the same shall not be taken into account for the purpose of materials reconciliation.

1.4 The contractor shall beer all other cost including lifting, carting from issue points to work site/ contractor's store, custody and handling etc. and return of surplus/ serviceable scrap materials to Owner's storage points to be designated by the Engineer-in-charge etc. No separate payment for such expenditure will be made.

1.5 No material shall be allowed to be taken outside the plant without a gate pass.

1.6 The contractor shall be responsible for proper storage, preservation and watch & ward of the materials.

1.7 **Reconciliation of Owner supplied materials**

1.7.1 Every month, the contractor shall submit an account for all materials issued by Owner in the proforma prescribed by the Engineer-in-charge. On completion of the work the contractor shall submit "Material Appropriation Statement" for all materials issued by the Owner in the proforma prescribed by the Engineer-in-charge.

Waste materials like part lengths of pipes and other partly used items are the property of GAIL (I) LTD. and must be returned to the store with the appreciate documentation so that they can be considered as part of the material reconciliation.

Item	Unaccountable	Scrap
Regulators & Meters	0%	0%
PE Pipes	2%	2% (less than 20.0 mtrs.)
GI Pipes*	2%	2% (less than 1.0 mtrs.)
Consumables	Discretionary	-

* In case supplied by Owner

Unaccountable wastage / scrap shall be at actual as per site assessment subject to maximum as stated above.

The percentage allowance shall be accounted on the basis of final measurement book.

1.7.2 All unused, scrap materials and salvageable materials shall be the property of the Owner and shall be returned by the Contractor category-wise at his cost to the Owner's designated store yard(s). In case the Contractor fails to do so/ or exceeds the limits of allowances specified above for scrap/ serviceable materials, then recovery for such quantities not returned as well as returned in excess of permitted limit

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by the Contractor will be done at the penal rate i.e. 125% of landed cost at the time of final bill/ closing of contract by Engineer-in-charge shall be effected from the Contractor's bill(s) or from any other dues of the Contractor to the Owner. Contractor shall be responsible for the adjustment/ weighment/ measurement of the surplus materials to be returned to the store. Contractor shall also be responsible for suitable segregation of returned materials into separate stacks of serviceable and scrap materials.

1.7.3 Wherever certain material is covered under Contractor's scope of supply whether part or in full for any item of work covered under SOR, no allowance towards wastage / scrap etc. shall be accounted for during execution stage.

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CONSTRUCTION EQUIPMENT TO BE DEPLOYED

(ANNEXURE-8 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-8
CONSTRUCTION EQUIPMENT TO BE DEPLOYED

Sl. No.	Description of Item	Min Qty. to be Deployed* per requirement
i.	Electro-fusion machine with **Bar Code, GPS antenna, Memory to store up to 2048 weld data, USB interface and control box with leads**	As and when required
ii.	Moling Equipment	As and when required
iii.	PE Squeeze Tools for 20mm / 32mm Pipes	2
iv.	Universal pipe scrapper 20mm, 32mm / hand scrappers	2
v.	Tapping tools for PE service tees	1 sets of all size
vi.	PE pipe cutter / Guillotine	2
vii.	Cable and pipe locator	As and when required
viii.	PE closure plugs / test ends for 20mm / 32mm pipes	As and when required
ix	Towing heads	As required
x.	Pipe alignment clamps, jointing of elbow, tee, top loading clamps for top tee	2
xi.	Pipe straighteners, re-rounding tools of all pipe sizes	2
xii.	Jumping Jack compactor	As and when required
xiii.	Roller for asphalting	As and when required
xiv.	Water tanker	As and when required
xv.	Hammer Drill	As and when required
xvi.	Power Generator a) 5.5 kVA, b) 2.5kVA	As and when required
xvii.	Piston Drill	As and when required
xviii.	Conversion Kit	As and when required
xix.	Pneumatic Test Pumps	2
xx.	Die sets for thread preparation	2
xxi.	Soldier Torch	2
xxii.	Cleaning pads	5
xxiii.	Cleaning Brush	5
xxiv.	Voltage Stabilizer	2
xxv.	Calibrated Pressure Gauge (0-6 Bar)	As and when required
xxvi.	Acetone/ H2O2 (pipe cleaner)	As and when required
xvii.	Harness belts & clamps	As and when required
xviii.	Live-wire dictator	2

* Number of equipment indicated hereinabove may be revised by Engineer In-charge for various sites depending on quantum of work and work front made available to the contractor. Any additional equipment requirement, whenever asked for by the Engineer In-charge, shall be deployed by the contractor at site without any additional cost to Owner.

Notes:

1. Any other equipment required for completion of pipeline laying work but not specifically mentioned hereinabove, shall be deployed by contractor without any additional cost to Owner. Contractor shall deploy above mentioned equipment's in good working condition & properly calibrated.

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2. Mobilization shall be considered complete only after equipment's having quantity specifically mentioned hereinabove / quantity decided by engineer-in-charge on case-to-case basis at site are made available at site in good wood working condition as verified by EIC.

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MINIMUM NO. OF SKILLED MANPOWER TO BE DEPLOYED

(ANNEXURE-9 TO SPECIAL CONDITIONS OF CONTRACT)

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ANNEXURE-9

NUMBER OF SKILLED MANPOWER TO BE DEPLOYED

S. No	Description	Requirement per contractor for contract award value up to ₹25 lakh.	Requirement per contractor for contract award value up to ₹50 lakh.
1	Resident Construction Manager / Section In charge	1	1
2	Mechanical Engineer/Planning / Engineer (QA/QC)	As required	As required
3	Safety supervisor	1	1
4	Foreman/Supervisor	1	1
5	Document Controller	As required	As required
6	Store Keeper/ Store in-charge	As and when required	As and when required
7	Fusion Operation/ Jointer	1	2
8	Skilled Workers (GI Plumber)	5	10
9	NG Conversion Team	1	2
10	Skilled Workers (Moling Team)	As and when required	As and when required
11	Unskilled Workers (Labour)	20	40

The above proposed list of skilled manpower is the minimum to be deployed by Contractor.

NOTES: -

1. The details of minimum manpower required to be mobilized by the execution contractor to complete the work within schedule is given above and is not exhaustive. Contractor is required to augment the above list with additional numbers/categories of workmen as required and directed by Engineer-In charge to complete the work within the completion time schedule.

2. The Manpower as identified above should have required qualification and adequate relevant experience.

3. The minimum no. of. skilled manpower to be deployed may however vary (increase/decrease) depending on availability of work front. The decision of EIC in this regard shall be final.

SCHEDULE OF LABOUR RATES

(ANNEXURE-10 TO SPECIAL CONDITIONS OF CONTRACT)

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ANNEXURE –10 to SCC

SCHEDULE OF LABOUR RATES (FOR EXTRA WORKS)

1. The Labour rates are "all inclusive". These rates include but are not limited to all payroll costs and allowances, payroll taxes, fringe benefits, protective and/or special clothing, construction supplies required for work of a nature included in this contract, overhead, profit, insurance, transportation and travel time.

2. The rates are inclusive of providing hand tools and consumables such as electrodes, filler wire, gases, grinding wheels where the concerned category of labour is expected to use in execution of the job but exclusive of all major equipment and machineries.

3. The normal time labour rates shall apply for all hours worked upto eight (8) hours in a day and overtime rates shall apply for all hours worked in excess of eight (8) hours in one working day, Sunday and Public Holidays. The payment for part of the day shall be made on prorata basis.

SR NO.	CLASSIFICATION PERSONNEL	RATE PER DAY OF NORMAL HOURS	RATE PER HOUR FOR OVER TIME, SUNDAY & HOLIDAY
		IN RS.	IN RS.
1	FOREMAN	3217	402
2	SURVEYOR	2275	284
3	SUPERVISOR	3575	446
4	ENGINEER	4550	568
5	SAFETY OFFICER	3575	446
6	GAS CUTTER	1502	187
7	GRINDER	1502	187
8	BRICK MASON	1040	130
9	STONE MASON	1040	130
10	STRUCTURAL WELDER	2145	268
11	QUALIFIED ARC WELDER-AUTOMATIC	2925	365
12	QUALIFIED ARC WELDER-MANUAL	2275	284
13	WATCHMAN/HELPER	845	105
14	CIVIL LABOUR (UNSKILLED LABOUR)	845	105
15	PIPELINE FITTER	1300	162
16	STRUCTURAL FITTER	1105	138
17	COATER	1105	138
18	MECHANIC	1105	138
19	SITE EQUIPMENT/MACHINE OPERATOR	1105	138
20	HEAVY MACHINE OPERATOR	1300	162
21	HEAVY DUTY DRIVER	1300	162

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22	ELECTRICIAN	1300	162
23	FABRICATOR	1300	162
24	CARPENTER	1040	130
25	PLUMBER	1040	130
26	PAINTER	1040	130
27	CABLE JOINTER	1040	130
28	FUSION OPERATION/JOINTER	1105	138
29	INSTRUMENTATION	1105	138
30	INSULATOR	910	114
31	RIGGER	975	122
32	BHISTI (WATER MAN)	845	106
33	DOCUMENT CONTROLLER	1300	163
34	ACCOUNT OFFICER	1950	244
35	STORE KEEPER/INCHARGE	1300	163

NOTES:-

1. Rates are final and bidder is to sign only without deviation.
2. In case of foreign bidder, conversion rate applicable on one day prior to price bid opening date published by the State Bank of India will be considered.
3. The recovery rates shall be the rates provided above plus 20% (twenty percent).

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EQUIPMENT HOURLY RENTAL RATES FOR EXTRA WORKS

(ANNEXURE-11 TO SPECIAL CONDITIONS OF CONTRACT)

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ANNEXURE-11 TO SCC

EQUIPMENT HOURLY RENTAL RATES FOR EXTRA WORKS

Sl. No.	Equipment	HIRING / RECOVERY RATES (IN INR) (Per Day): 8 Hrs INCLUDING CONSUMABLES & FUEL
1	Excavator / Back Hoe-Ex 280 / 300 & Above or Equivalent	10,000
2	Excavator / Back Hoe-Ex 200 & Above or Equivalent	8,000
3	Pipe Layer/Side Boom – 70 T & Above Capacity	15,000
4	Pipe Layer/Side Boom – 60 T & Above Capacity	12,000
5	Pipe Layer/Side Boom – 40 T & Above Capacity	10,000
6	Pipe Bending Machine	12,000
7	Dozer with Ripper – D7/D6 or Equivalent	12,000
8	DG Welding Machines	3,350
9	Semi Auto Welding Machines	2,500
10	Dozer with Ripper – D8 or Equivalent	13,600
11	Hydra (upto 10 MT)	5,000
12	Hydra (above 10 MT - upto 25 MT)	7,850
13	Hydra (above 25 MT to 40T)	8,950
14	Hydra (above 41 MT to 80T)	16,800
15	Horizontal Auger Boring Machine with Rock breaking tool	7,500
16	Pipe Clamp (Pneumatic/Hydraulic) – Internal	2,000
17	Tyre Mounted Cranes (above 10 and upto 30 MT)	7,850
18	Tyre Mounted Cranes (above 30 and upto 75 MT)	9,500
19	Tyre Mounted Cranes (above 75 MT)	16,800
20	X-Ray M/C – Internal Crawler	3,500
21	X-Ray M/C – External	3,000
22	Gamma Source	3,000
23	Water Lifting Pump (400 m3/hr. & above)	5,000
24	Filling Pumps (400 TO 1000 M3/HR)	8,000
25	Pressurization Pump – Motorized	6,000
26	Induction/Resistance Heating Equipment or LPG Multi Torch.	4,000
27	Air Compressor – (300CFM)	8,900
28	Air Compressor – (450/600/800 CFM)	14,100
29	Air Compressor – (1000-1500) CFM	25,000
30	D.G. Sets : 62.5 KVA to 200 KVA (inclusive of generators)	3,300
31	Blast Cleaning Machine	3,500
32	Pipe Trailers (FB / Semi Low Bed)	10,000
33.	Mono drill crawler mounted	4,500

34	Hand drill(pneumatic)for rock blasting	8,400
35	Rock breaker attachment	9,136
36	Dozing Pump	1,000
37	Bevel Cutting Machine –Manua	5,000
38	UT Machine with operator	3,500
39	Dewatering Pump	2,500
40	Holiday Detector Unit	1,250
41	Dead WT Tester	2,200
42	Dumper / Tippers	4,200
43	Pipe locator	1,000
44	Pipe Clamp – External	1,000
45	Pipe Trailer for Coated Line Pipe	10,000
46	Rock Breaking Machine with Excavator	8,536
47	Grinding machine	300
48	Gas cutting set with cylinders	750
49	Trucks (upto 9 T) with driver	5,000
50	Car/Jeep with driver (5 Seater)	5,000
51	Car/Jeep with driver (7 Seater)	8,000
52	Tractor with trolley	2,000
53	Tripod with 5 Tons Chain Pulley Block	3,350
54	Pneumatic Drill (Tractor mounted for blasting) with Compressor	8,400
55	JCB Excavator	8,000
56	JCB Excavator with rock breaking tool	12,000
57	Moling machine (Manual)	3,000
58	Moling machine (Machine)	5,000
59	Fusion jointing Machine	5,000
60	Concrete mixer 0.25 to 0.40 Cum with hopper or as required.	1,000
HDD equipments		
61.	HDD Rig with all Equipments & Accessories (Cap upto 50 T) (Soft Strata)	20,000
62.	HDD Rig with all Equipments & Accessories (Cap upto 50 T) (Rock Strata)	25,000
63.	HDD Rig with all Equipments & Accessories (Cap above 50 T and upto 100 T) (Soft Strata)	30,000
64.	HDD Rig with all Equipments & Accessories (Cap above 50 T and upto 100 T) (Rock Strata)	40,000
65.	HDD Rig with all Equipments & Accessories (Cap above 100 T and upto 200 T) (Soft Strata)	80,000
66.	HDD Rig with all Equipments & Accessories (Cap above 100 T and upto 200 T (Rock Strata)	100,000
67.	HDD Rig with all Equipments & Accessories (Cap above 200 T and upto 350T) (Soft Strata)	115,000
68.	HDD Rig with all Equipments & Accessories (Cap above 200 T and upto 350T (Rock Strata)	140,000

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69.	HDD Rig with all Equipment's & Accessories (Cap above 350 T) (Soft Strata)	150,000
70.	HDD Rig with all Equipment's & Accessories (Cap above 350 T) (Rock Strata)	180,000

NOTES: -

1. Rates are inclusive of operators / drivers / Fuel /POL and consumables.

2. Rates are inclusive of contractor's overheads & profit.

3. In case of foreign bidder, conversion rate applicable on one day prior to price bid opening date published by the State Bank of India will be considered.

4. The recovery rates shall be the rates provided above plus 20% (twenty percent).

5. Hiring rates of above equipment's are for one shift (i.e. 8 Hrs). Hiring rates for two shifts i.e. 16 hrs are 1.25 times of above rates & hiring rates for three shifts i.e. 24 hrs are 1.5 times of above Rates.

6. **Notes for HDD equipment: -**
   a. Rates are inclusive of operators / drivers / Fuel /POL and consumables.

   b. Rates are inclusive of contractor's overheads & profit.

   c. In case of foreign bidder, conversion rate applicable on one day prior to price bid. opening date published by the State Bank of India will be considered.
   d. The recovery rates shall be the rates provided above plus 20% (twenty percent).

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STANDARD CONDITIONS OF SCC: PART II

The contractor has to fully comply with all applicable labour laws and regulations passed, modified and notified from time-to-time by the central, state and local government agencies/authorities. Specific attention of the contractor is drawn to the following obligations amongst other:

1. The Minimum Wages Act 1948, Payment of Wages Act, 1936 and Payment of Bonus Act 1965 or The Code on Wages, 2019 (after it comes into force)

1.1 **Minimum Wages:**

a) During the tenure of the contract, the Contractor must ensure the payment of minimum wages, as notified by the Central Government or State Government whichever is higher, as per the provisions of the Minimum Wages Act, 1948 / Code on Wages, 2019 (after it comes into force).

b) **Wage period and monthly wages**: Wage period shall be monthly and wages for a month shall be calculated by multiplying daily rate of Minimum Wages by 26. The monthly wages include the wages of the weekly days of rest as applicable to the office/establishment of GAIL.

Deduction in case of any days of absence other than weekly days of rest shall be calculated using the following formula:

Deduction for absence = days of absence x applicable wage rate

1.2 **Payment of Wages:**

The Contractor shall disburse monthly wages **through e-banking / digital mode through cashless transaction only**, and avoid illegitimate deductions and maintain records /returns as prescribed. The Contractor shall be solely responsible for the payment of wages and other dues to the resources, if any, deployed by him latest by 7^{th} day of the subsequent month as per the provisions of the Payment of Wages Act, 1936 / as applicable under Code on Wages, 2019 (after it comes into force) in the presence of Engineer In-charge (EIC) or authorized representative of GAIL. After disbursement of wages, the representative of the Contractor and EIC/ authorised representative of GAIL. have to certify the payment of wages to the resources and sign the Wage Register - Form B (under The Ease of Compliance to Maintain Registers under various Labour Laws Rules, 2017) / FORM-I of Code on Wages, 2019 (after it comes into force) with specific seal detailing name/designation/Company.

1.3 Payment of Wages:

Contractor shall ensure payment of bonus as per the provisions of the Payment of Bonus Act, 1965 / Code on Wages, 2019 (after it comes into force). Present minimum rate of payment of

Bonus as per the Payment of Bonus Act, 1965 is 8.33% of minimum wages per month
or
8.33% of Rs.7, 000/- per month whichever is higher. The rate shall be subject to amendments made from time to time to the legislation.

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Payment of Bonus / ex-gratia shall be made preferably before Deepawali festival falling after the end of relevant financial year(s) and the balance payment at the time of closure of contract.

For service contracts, the payment towards the bonus/ex-gratia **(made on yearly basis)** shall be released / reimbursed to the contractor, after submission of proof of payment. No reimbursement shall however be applicable in works contract.

2. **Leaves/ Leave with wages/ Holiday:**

The Contractor shall comply with all the applicable leave Rules including leave with wages in terms of applicable labour legislations i.e. Factories Act, 1948 / Shops & Establishment Act/ *Industrial Establishment* (*national* & *festival holidays*, *casual* & *sick leave*) *Act*, 1965.

The Contractor shall extend the leave with wages and maintain the Register of Leave pertaining to the resource deployed. The payment towards un-availed leave, as per the Factories Act, 1948 / Shops & Establishment Act, shall be settled with the resource at the time of closure of the contract or separation of resource from the contract by the contractor.

a) As per the **Factories Act, 1948 (if applicable)**:-Annual Leave with Wages @ 01 day for every 20 days of work performed by him in the previous calendar year becomes due.

b) As per the **Shops & Establishment Act(if applicable)** : Privilege Leave not less than 15 days and Sickness/Casual Leave not less than 12 days (this provision may vary from state to state).

c) *As per the Industrial Establishment* **(***national* **&** *festival holidays***,** *casual* **&** *sick leave***)** *Act***, 1965 /Negotiable Instrument Act 1881/ shops & Establishment Act (as applicable)**:

(a) Three national holidays of one whole day each on the 26th January, 15th August and 2nd October

(b) Five other holidays on any of the festivals specified in the – Schedule appended to this Act.

(c) Every worker shall in each calendar year, be allowed by the employer 07 casual leave and 14 sick leave in such manner and on such conditions as may be prescribed (This provision may vary from state to state).

3. **The Employees' Provident Fund & Miscellaneous Provisions Act 1952**

a) The Contractor shall have independent PF code no. with the RPFC as required under the Employees' PF & Misc. Provisions Act,1952.

b) The Contractor has to ensure compliance (as per prevailing rates) and extend benefits under the Employees' Provident Fund Scheme 1952, the Employees' Pension Scheme 1995 & the Employees' Deposit Linked Insurance Scheme, 1976 to the resources deployed by him.

c) The Contractor is required to submit copies of ***separate e-Challans / ECR alongwith proof of payment/receipt*** in respect of resources engaged through this contract only, on monthly basis. **Common challans would not be acceptable in GAIL (I) Ltd..**The Contractor should submit copies of previous months EPF e-Challans / ECR alongwith current month's bill. The TRRN. No. of the ECR would be verified online from EPFO portal by the Engineer- in-charge to confirm the status of payment and names of the resources deployed.

d) **PF is mandatory irrespective of the number of resources deployed** by the Contractor under this contract. PF membership and deposit of PF contribution is also mandatory even if the wage payment to the resource is exceeding the prescribed monthly wage ceiling (i.e. Rs. 15,000/-) under the Empl oyees' PF & Misc . Provi sions Act, 1952 and in such cas e the liability of the Contractor towards PF contribution shall be limited to the prescribed monthly wage ceiling notified from time to time (i.e. Rs. 15,000/- currently).

e) In case, the Contractor deploys any **"International Worker"**, the Contractor should also make compliance under para 83 of EPF Scheme, 1952 i.r.o the "International Workers" and must register on the ***International Worker Portal of EPFO.***

4. **The Employees' State Insurance Act, 1948 (If applicable and as per prevailing rates)**

a) The Contractor shall have his own ESI code No. allotted by Employees' State Insurance Corporation (ESIC) as required under the Employees' State Insurance Act, 1948.

b) The Contractor has to arrange **Smart Cards (i.e. ESI Identity Card) /e-Penchan Card** for the resource(s) engaged by him from the Corporation.

5. **The Employees' Compensation Act 1923 (wherever applicable)**

In case, the work place is out of the notified coverage area under ESIC i.e. ESIC is not implemented in the area **or** in case of excluded employees under ESIC, the Contractor is required to take Employee Compensation / Workmen Compensation Policy from IRDAI approved Insurance Company taking into consideration the **maximum compensation liability** as per provisions of Employees' Compensation Act, 1923. It must be ensured that the contractor/contracting firm should extend coverage to the contract workers through Employee Compensation Policy, to meet the **Compensation Liability** under **Employee's Compensation Act, 1923** along with **Medi-claim Floater Policy with a coverage of Rs. 3 Lakhs per resource covering his/her spouse and two children.**

6. **Group Personal Accident Insurance Policy**

The Contractor is required to take a Group Personal Accident Insurance Policy with coverage of Rs. 5 Lakhs (covering death, permanent disability + partial disability) per resource for the entire period of contract covering all resources deployed under the contract.

7. **The Payment of Death Gratuity Act, 1972**

In case of Death or permanent disablement of a resource during execution of work under the contract, the Contractor has to pay the Gratuity as per the provision under the Payment of Gratuity Act, 1972 to the nominee(s) of the resource as per the details maintained in the duly

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signed Nomination Form maintained by the Contractor. The proof of disbursement may be submitted to the EIC for claiming reimbursement of amount paid towards death Gratuity from GAIL.

8. **The Contract Labour (R&A) Act, 1970**

a) The Contractor is required to obtain Labour license under the provisions of the Contract Labour (R&A) Act, 1970 from the office of Licensing Officer, Central Labour Authority, Ministry of Labour and Employment, Govt. of India having jurisdiction of the Region.

b) The Contractor shall discharge obligations as provided under the Contract Labour (R&A) Act, 1970 rules and regulations framed under the same and enforced from time to time.

c) The Contractor shall ensure regular and effective supervision and control over the resources deployed for which a supervisor / representative of the Contractor should be available at all the times for giving suitable direction for undertaking the Contractual Obligations.

d) The Contractor is solely responsible for payment of wages to each resource deployed by him and such wages shall be paid before the expiry of such period as may be prescribed.

e) It shall be the duty of the Contractor to ensure the disbursement of wages to resource(s) through e-banking/digital mode. In case the resource does not have a bank account, the disbursement of wages may be made in cash in the presence of the Engineer-in-charge / authorized representative of GAIL. initially and Contractor shall simultaneously arrange for opening the bank account of each contract labour deployed by him.

f) In case, the Contractor fails to make payment of wages and deposit of PF contribution within the prescribed period or makes short payment of wages / short deposit of PF contribution, it shall be treated as FAILURE and action as per the provisions of General Conditions of Contract shall be taken. Further, GAIL., as Principal Employer, will make payment of wages in full or the unpaid balance due, as the case may be, to the resource(s) deployed by the Contractor and deposit the PF contribution with PF authorities. Such amounts will be recovered from the Contractor either by deduction from any amount payable to the Contractor under any contract or as a debt payable by the Contractor.

9. The contractor is required to comply with all applicable labour laws and regulations including, but not limited to the following:

a) The Factories Act, 1948 / The Shops & Establishment Act, 1948 (which ever applicable)
b) The Maternity Benefit Act, 1961
c) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1979 & Building and Other Construction Workers Welfare Cess Act, 1996
d) The Inter State Migrant Workmen (RECS) Act 1979 (if applicable)
e) Contract Labour (R&A) Act-1970
f) Employees' Provident Fund & Misc. Provisions Act-1952
g) Employees' State Insurance Act-1948
h) Employees' Compensation Act, 1923
i) Payment of Gratuity Act,1972

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j) Minimum of ages Act, 1948
k) The Payment of Wages Act, 1936
l) The Payment of Bonus Act, 1965

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Responsibilities of the Contractor

1. The Contractor shall be solely responsible and indemnify GAIL against all charges, dues, claim etc. arising out of the disputes relating to the dues and employment of resources, if any, deployed by him.

2. The Contractor shall indemnify GAIL against all losses or damages, if any, caused to it on account of acts of the resource(s) deployed by him.

3. Any loss of life, personal injury, or damage to property occurring during the execution of the work shall be the sole responsibility of the contractor. GAIL (I) LTD or its authorized consultant shall not be liable for any civil, criminal, statutory, or financial obligations arising out of such incidents.

4. The Contractor shall indemnify GAIL from all claims, demands, actions, cost and charges etc. brought by any court, competent authority / statutory authorities against GAIL.

5. The Contractor shall also indemnify GAIL for any action brought against him for violation, non-compliance of any act, rules & regulation of center / state / local statutory authorities.

6. All resources deployed by the Contractor are deemed to be on the rolls of the Contractor.

7. **Age:** No resource below the age of 18 years shall be deployed by the contractor for the execution of the contract. However, maximum age of resources deployed under the contract would be 60 years. (In case of Security and Fire & Safety Services, no resource below the age of 18 years shall be deployed by the contractor for the execution of the contract. However, in view of nature of business operation and nature of duty, for efficacy & efficiency purpose, resources will be deployed up to the age of 58 years. However, the age limit can be relaxed for a further period of two (02) years up to the age of 60 years if the contract worker is competent, efficient and medically fit i.e. physically fit with good health, good eye sight without any disease. The contractor has to produce Medical Fitness Certificate, to this effect, against such contract workers if deployed beyond 58 years.)

8. **Appointment/Nomination of supervisor:**
As a part of the contract, the Contractor is required to appoint/nominate a supervisor (s) who will supervise, control and give directions to the resource(s) for discharging the contractual obligations. Accordingly, the Contractor has to give in writing the name and contact details of the supervisor (s) to the EIC. A copy of the same is also to be sent to HR In-charge and Security In-charge for records.

9. A copy of the Letter of Acceptance (LOA) should be submitted to the Security Department by the Contractor / his representative or supervisor for facilitating the movement of resource(s) including machine & materials involved in the contract.

10. The resources to be deputed/ deployed by the Contractor shall observe all security, fire and safety rules of GAIL while at the site/work. All existing and amended safety / fire rules of GAIL are to be followed at the work site by the Contractor and his deployed resource(s).

11. Personal Protective Equipment/ Safety Kit and Liveries: Contractor shall ensure adequate supply of personal protective equipment / Safety Kit and Liveries as mentioned in the Scope of Work to all such resources deployed.

12. In case of accident, injury or death caused to the resource(s) while executing the Work under the contract, the Contractor shall be solely responsible for payment of adequate compensation, insurance

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money etc. to the next kith & kin of injured / diseased. Contractor shall indemnify GAIL from such liabilities.

13. The Contractor shall not deploy any resource suffering from any contagious or infectious disease. The Contractor shall get the deployed resource(s) examined from a civil Govt. Doctor / GAIL's Doctor.

14. No resource(s) or representatives of Contractor (including Contractor) be allowed to consume alcoholic drinks or any narcotics within the premises of GAIL (including Plant, Office and Residential etc.). If found under the influence of above, the Contractor shall immediately replace that resource(s) with intimation to the EIC.

15. While engaging / deploying the resources, the Contractor is required to make efforts to provide opportunity of employment to resources belonging to **Schedule Caste**, **Schedule Tribe** and **Other Backward Class** in order to have a fair representation of these sections of the society.

16. While engaging the resources, the Contractor is required to make efforts to provide an **opportunity to** candidates with experience of **apprentice training in GAIL** under the provisions of the Apprentices Act, 1961.

17. The Contractor is required to maintain all Registers and other records in an **office** within the premises of GAIL or at a place **within a radius of three kilometers.**

18. Contractor shall provide proper **Employment cards (FORM XII)** for the resource to be deployed by him, duly signed by the Contractor or authorized person on behalf of Contractor.

19. **Gate/ Entry Pass or Authorization:**

Entry to the premises of GAIL is restricted and is subject to appropriate entry authorization in the prescribed format of a Gate Pass or any other entry auth01ization w.r.t police verification as per instruction of Security department from time to time. Similarly, entry for material/ equipment's/ tools/ tackles etc. is restricted & subject to entry authorization by security department.

20. The Contractor shall issue Identity cards in his firm's name to the resource deployed.

21. Discipline of the resource(s) during discharge of duties must be regulated by the Contractor himself or by his representative.

22. **Police verification**

a) The Contractor (including his sub-Contractors/Petty Contractors etc, if allowed) will undertake police verification in respect of the resource(s) engaged by him in GAIL's premises. Such verification will have to be carried out from concerned police station of their permanent place of residence/present place of residence.

b) Further, the Contractor is advised not to deploy any resource having past criminal record in the establishment/premises of GAIL under this contract awarded to him.

c) In the event of violation of above clauses at (a) and (b), the Contractor will be solely responsible for the same.

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d) If any such resource(s) having criminal record is deployed by the Contractor in the premises of GAIL and has come to the notice of GAIL at any point of time, the Contractor shall immediately replace that resource(s), failing which that particular resource(s) of the Contractor will not be allowed to enter into the premises of GAIL.

23. While confirming to any of these conditions, the Contractor must ensure that all applicable Laws of State regarding labour, their welfare, conduct etc. are complied.

24. The contractor shall ensure the KYC of contract workers in EPFO portal at all time during the period of contract and submit a proof of the same to the Engineer-in-charge.

25. The contractor shall ensure that the nomination of contract workers deployed by him under the said contract is duly updated in the EPFO Portal.

Compliance of Government of India Directives

1. **Pradhan Mantri Suraksha Bima Yojna (PMSBY) and Pradhan Mantri Jeevan Jyoti Bima Yojna (PMJJBY)**

   Contractor shall, ensure that all its resources deployed under this contract have obtained additional insurance coverage under the Pradhan Mantri Suraksha Bima Yojana (PMSBY) and Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) through the participating banks and submit the proof of such insurance coverage to the satisfaction of GAIL. The Contractor shall submit evidence / proof to GAIL in this respect. Both the schemes are to be regulated continuously on yearly basis and the same should be renewed on each successive relevant date in subsequent years during the period of the contract.

2. **Labour Identification Number (i.e. LIN) Registration (Mandatory)**

   The Unified Shram Suvidha Portal, developed by Government of India, facilitates reporting of Inspections & submission of Returns and has also been envisaged as a single point of contact between employer, resources and enforcement agencies bringing in transparency in their day-to- day interactions. For integration of data among various enforcement Agencies, the Contractor, as an inspectable unit, is required to register and obtain Labour Identification Number (i.e. LIN) from Shram Suvidha Portal and submit the same in GAIL.

3. **Pradhan Mantri Rojgar Protsahan Vojna (PMRPY) / Aatmanirbhar Bharat Rozgar Yojana (ABRY)/ Pradhan Mantri Garib Kalyan Yojana- if applicable**

   In order to support the Govt. of India's Initiative on Employment Generation, the Contractor must register for Pradhan Mantri Rojgar Protsahan Yojna (PMRPY) Scheme / Aatmanirbhar Bharat Rozgar Yojana (ABRY) /Pradhan Mantri Garib Kalyan Yojana (as applicable). In service contracts, the Contractor shall inform GAIL/Engineer in Charge about the benefit availed, if any, against the scheme for adjustment against the invoice(s) / bill(s).

Records and Registers

1. **Maintenance of records and registers**

   The Contractor is required to maintain statutory records and registers for applicable labour laws as prescribed under the following rules:

   a) Ease of Compliance to Maintain Registers under the various Labour Laws, 2017

   b) Rationalization of Forms and Reports under Certain Labour Laws Rules, 2017

   c) Labour Codes (after they are made effective by Government of India)

2. The Contractor has to maintain the following (but not limited to) Registers/ Forms/ Reports / Returns at all times:

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a) Employee Register in FORM A (to be replaced by FORM-IVof Code on Wages-2019 after it comes into force)

b) Wage Register in FORM B (to be replaced by Register of Wages, Overtime, Fine, Deduction for damage and Loss in FORM-I of Code on Wages-2019 after it comes into force)

c) Register of Loan / Recoveries in FORM C

d) Attendance Register in FORM D

e) Register of rest/leave/leave wages in FORM E

f) Copies of Wage Slips in FORM XIX (to be replaced by FORM- V of Code on Wages-2019, after it comes into force)

g) Copies of Employment Card in FORM XII

3. **Documents to be submitted by the Contractor to EIC at various stages during the currency of the contract**

a) **Immediately after issuance/receiving o(Letter o(Acceptance (LOA)**

i. Details as required for issuance of **FORM - VII (Notice of Commencement of Work)**
ii. Application for issuance of **FORM -III (Form of Certificate by Principal Employer)** for obtaining Labour License from Licensing Authority for engaging 20 or more resources.
iii. Copy of **FORM - VI (License)** before commencement of work if 20 or more resources are engaged.
iv. Copy of **Provident Fund Registration Certificate** issued by concerned Regional Provident Fund Commissioner.
v. Copy of **ESI Registration Certificate** issued by concerned ESIC.
vi. Copies **Insurance Policy(ies)** as mentioned at ***Annexure-iv***
vii. Copy of **Labour Identification Number (i.e. LIN)** Registration done in **Shram Suvidha Portal** of Govt. of India.
viii. Copy of registration under the Building and Other Construction Workers (RE&CS) Act, 1996 in case he employs ten or more building workers in any building or other construction work.

b) ***At the time of submission of RA Bills***

i. Copy of **Employee Register in FORM - A** under The Ease of Compliance to Maintain Registers under various Labour Laws Rules, 2017 (to be replaced by FORM- IV (of Code on Wages-2019, after it comes into force).
ii. Copy of **Wage Register in FORM-B** under The Ease of Compliance to Maintain Registers under various Labour Laws Rules, 2017 (to be replaced by Register of Wages, Overtime, Fine, Deduction for damage and Loss in FORM-I of Code on Wages-2019, after it comes into force) duly certified by **authorized representative** of the Contractor and **authorized person** in GAIL certifying as ***"Certified that the amount shown in the column No. ---- has been paid to the workman concerned in my presence on------(date) at -------(place)"*** along with copy of bank statement duly certified by bank and copy of online transaction statement against each resource with details of name, account number,

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amount paid & date of payment as proof of **Cashless Transaction / Payment of wages through e-banking/digital mode.**

iii. As a part of compliance and proof of depositing Provident Fund, EDLI and ESI contributions the Contractor shall submit copies of the ***Separate e-Challans / ECR***, bank receipts/bank statement **in respect of resources deployed in GAIL in the previous month in this contract.** The documents should also contain details of resources, PF account No., ESI No., contributions of resources and employer etc.

iv. Dully filled in statement as per ***Annexure- i.***

v. Copy of Wage Slips in FORM XIX

vi. Proof of deposit of Cess under The Building and Other Construction Workers' Welfare Cess Act, 1996, (if applicable)

c) **At the time of closure of contract**

i. **Indemnity Bond** of Rs. 100/- duly notarized from Notary indemnifying GAIL from all liabilities w.r.t. the resource engaged by the Contractor regarding payment of wages, Provident Fund/ESI contributions, Insurance and other statutory payments. Format for Indemnity Bond is enclosed at ***Annexure- ii.***

ii. Copy of the **Wage Register in FORM- B** (to be replaced by FORM-I of Code on Wages- 2019 after it comes into force) for the last month.

iii. Copies of Service Certificates issue to resource in **FORM VIII**

iv. Copy of the ECR related to EPF and ESIC Compliance in respect of Resource.

v. Details as required for issuance of **FORM- VII (Notice of Completion of Work)**

vi. Copies of FORM-C & FORM -D under the Payment of Bonus Act 1965 as proof of payment towards Bonus.

vii. Copy of proof towards release of Leave Encashment

viii. Copies of No Dues Certificate from contract workers stating they have received all statutory payments and social benefits.

ix. Proof towards PF KYC compliance of contract workers

x. Proof of deposit of total Cess under The Building and Other Construction Workers' Welfare Cess Act, 1996, (if applicable) with final assessment from respective Cess Collector(s).

4. **Verifications of bills and documents submitted by the Contractor**

Before certifying/verifying the running/ final bill/invoice of the Contractor, the designated EIC of the respective contract of GAIL, shall verify from the ECRs of PF/ESI, through respective web portals, the detail/status of the payment made by the Contractor. In case the information furnished by the Contractor is found to be incorrect, GAIL shall take appropriate action against the Contractor under relevant conditions as available in the tender/bid document.

Annexure-I

Statement in support of RA Bill for the Month of_____, 20_

(1) Name of the Firm/Agency/Contractor _____

(2) Nature of Contract: Job/ Service _____

(3) Period of Contract: From _____ to _____

(a) Extension Period of Contract, if any from _____to _____

(b) Place where contract workmen are working _____

(4) Postal address of the Contractor: _____

(5) Phone No. of the Contractor: _____

(6) Fax No. and Email of the Contractor: _____

(7) Name and Address of PF office from where EPF Code No. has been allotted:_____

_____

(8) EPF CodeNo. allotted by PF office: _____

(9) Name and Address of ESIC office from where ESI Code No. has been allotted:_____

_____

(10) ESI Code No. allotted by ESIC office: _____

(11) Labour License No. _____ dated _____

(12) Validity period of Labour License from _____to _____

(13) Detail of Resource engaged by the Contractor:

Category	No. of Resources		Prevailing Minimum Wages
	Male	Female	
Unskilled			
Semi-skilled			
Skilled			
Highly skilled			
Total			

(14) Copy of Wage Register in FORM-B (to be replaced by FORM-I as per Code on Wages-2019, after it comes into force)

(15) Details of deposit of contribution towards EPF:

a) EPF Challan No. _____Amount _____Date _____

(16) Details of Deposition of contribution towards ESI

a) EPF Challan No. _____Amount _____Date _____

(17) Whether any arrangement / agreement has been entered with any resource for extending benefits under Inter-state Migrant Workmen (RE&CS) Act, 1979: _____(Yes /No)

If Yes, No. of such Inter-state Migrant Workers: _____

SIGNATURE OF CONTRACTOR/AUTHORIZED REPRESENTATIVE

Place:

Date:

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Annexure - iv

Summary of Insurance Policies

Contractor is required to cover all resources deployed by him with the following insurances / schemes:

Sl. No.	SCHEME	APPLICABILITY	PREMIUM/ CONTRIBUTION	SUM ASSURED/ BENEFITS	REMARKS
1	The Employees' State Insurance Act, 1948	Applicable to all resources of the Contractor (within ESI wage limit) working in notified area.	3.25% of wages by employer 0.75% of wages by employees	Benefits under the Employees' State Insurance Act, 1948.	
2	The Employees' Compensation Act, 1923 (in lieu of ESI – mentioned at Sl. 1)	Applicable to excluded employees under ESI and those who are working in non-notified area to extend similar benefits as available under ESI Act, 1948	Premium to be calculated considering wage limit under EC Act, 1923 (i.e. Rs. 15,000/- p.m currently)	Maximum **Compensation Liability** under Employee's Compensation Act, 1923 along with **a Mediclaim floater policy with a coverage of Rs. 3 Lakhs per resource covering his/her spouse and two children.**	Provides compensation and medical facility to resources.
3	Group personal Accident Insurance	Applicable to all resources of the Contractor	Based on the coverage	Insured value: **Rs. 5 Lakh** to cover expenses associated with any accident.	Death, permanent disablement, temporary total disability or any other medical expenses related to
4	Pradhan Matri Suraksha Bima Yojana (PMSBY)	Eligibility – age group 18 to 70 years	Rs. 12/- per annum	**Accidental** death and permanent disability: (i) Permanent total disability – Rs.2 lakhs. (ii) Permanent partial disability – Rs. 1 Lakh.	

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5	Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJB)	Eligibility – age group 18 to 50 years. (can continue upto 55 years)	Rs. 330/- per annum.	Risk coverage – Rs. 2 Lakhs- in case of **death due to any reason**

SECTION-VI

TECHNICAL SPECIFICATION /DRAWINGS

& LIST OF APPROVED MAKES

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1.0 PROJECT DESCRIPTION & SCOPE OF WORK

1.1 Project Description

M/s GAIL (India) Limited, is in the process of development of CNG & City Gas Distribution Infrastructure at different Geographical Areas namely Varanasi (UP); Patna (Bihar); Ranchi & Jamshedpur (Jharkhand) and Bhubaneswar & Cuttack (Odisha).

1.2 Scope of Work

The scope of work covers the laying, testing, and commissioning of underground Polyethylene (PE) pipeline networks of sizes ranging from 20 mm to 125 mm for the City Gas Distribution (CGD) project, including connections to District Regulating Stations (DRS), existing pipeline networks, and other associated facilities. The work shall include laying of PE pipelines in new areas as well as in leftover or incomplete stretches of previously executed works to complete the pipeline network as a continuous single piece and make it ready for commissioning. The scope shall also include the execution of GI service connection works from the PE pipeline network up to the customer premises, including installation of GI pipes, isolation valves, transition fittings, regulators, meters (where applicable), and all associated fittings and accessories required for providing domestic, commercial, and industrial PNG connections. The Contractor shall carry out all activities necessary for successful execution of the work, including route survey, excavation, trenching, pipe laying, electrofusion and/or butt fusion jointing, installation of valves and fittings, road, drain, culvert, and utility crossings using approved methods, backfilling, compaction, restoration of roads and other disturbed surfaces, pneumatic strength and leak testing, purging, commissioning, preparation and submission of as-built drawings and test records, obtaining necessary clearances from local authorities wherever required, and all other incidental works necessary for the complete execution and commissioning of the PE pipeline network and GI service connections in accordance with the approved drawings, technical specifications, applicable codes and standards, statutory requirements, and the instructions of the Engineer-in-Charge.

The broad scope of this /bid comprised of but not limited to the following:

- Route survey, site verification, utility identification, and setting out of the pipeline alignment as per approved drawings.
- Excavation, trenching, shoring, dewatering (where required), and preparation of trench for laying of underground PE pipelines.
- Loading, unloading, handling, transportation, storage, stringing, laying, alignment, lowering, and installation of Polyethylene (PE) pipelines of sizes ranging from 20 mm to 125 mm, including execution in new areas as well as leftover/incomplete stretches to complete the pipeline network.
- Electrofusion and/or butt fusion jointing of PE pipes and fittings, installation of tees, bends, reducers, couplers, end caps, transition fittings, valves, service tees, and all other pipeline appurtenances.
- Installation of PE pipeline crossings across roads, drains, culverts, railways, canals, and underground utilities using approved construction methodologies, including HDD/open-cut methods wherever specified.
- Supply, laying, and compaction of sand bedding, warning mesh, route markers, marker tapes, protective covers, and selected backfill material wherever required.
- Backfilling, compaction, disposal of surplus excavated earth, and restoration of roads, pavements, footpaths, drains, and all other disturbed surfaces to the satisfaction of the concerned authorities.

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- Fabrication, installation, testing, and commissioning of above-ground GI service connections, including risers, laterals, isolation valves, transition fittings, regulators, meters (where applicable), clamps, supports, fittings, and all associated accessories for domestic, commercial, and industrial PNG connections.
- Hook-up, tie-in, and interconnection of newly laid PE pipelines with existing PE networks, District Regulating Stations (DRS), valve stations, service pipelines, and other facilities.
- Pneumatic strength testing, leak testing, flushing, nitrogen purging, pre-commissioning, commissioning, and gas charging assistance as per applicable specifications and approved procedures.
- Preparation and submission of construction methodology, work procedures, quality assurance documents, inspection reports, test certificates, calibration certificates, as-built drawings, measurement records, and all other project documentation.
- Arrangement of all manpower, supervision, tools and tackles, machinery, construction equipment, consumables, temporary facilities, barricading, safety equipment, traffic management, and logistics required for successful execution of the work.
- Obtaining statutory permissions, coordinating with local authorities and utility agencies, and ensuring protection of existing underground and above-ground utilities during execution of the work.
- Carrying out all civil, mechanical, and incidental works necessary for completion of the PE pipeline network, including reinstatement, housekeeping, preservation, and demobilization.
- Any other item of work, whether specifically mentioned or not, but required for the safe, complete, and successful execution, testing, commissioning, and handing over of the PE pipeline network and associated GI service connections in accordance with the Contract, approved drawings, technical specifications, applicable codes and standards, and the instructions of the Engineer-in-Charge. •
- Supply, fabrication and installation of Plate marker.
- Making of PCC pedestal of grade (1:2:4) and size (8"X6"X4").
- Supply and Installation of TF along with GI Sleeve.
- Reconciliation of material received from store each time before submission of RA bills.
- It will be the responsibility of the contractor to follow Mobile APP based safety work permit system of GAIL. Contractor/its supervisor shall compulsorily download these Mobile APP, authorization for work permit will be given as per GAIL procedure.
- It will be responsibility of the contractor to implement "Call before you dig" CBuD application and make entry of any excavation / digging activities. Familiarization with the Mobile APP will be done by GAIL Site Engineer/In charge.
- Contractor will be required to fill the LMC/PE Checklist provided by GAIL. Format of the same is also provided in the tender/bid document.

- Contractor will be bound to follow the Standard Operating Procedure (SOP) of GAIL for carrying out the various jobs assigned.
- The Contractor shall complete all works in accordance with the Schedule of Rates (SOR) of the respective GA and the quantities awarded under the Contract

2. GENERAL TERMS AND CONDITION

i. Special Condition of Contract shall be read in Conjunction with the General Conditions of Contract, SOR, PJS of work, specifications, Drawings and any other documents forming part of this contract wherever the context so requires.

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ii. Notwithstanding the sub-division of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.

iii. Where any portion of the General Condition of Contract is repugnant, to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears, the provisions of the Special Conditions of Contract shall be deemed to over-ride the provisions of the General Condition of Contract and shall to the extent of such repugnancy, or variations, prevail.

iv. The materials, design and workmanship shall satisfy the relevant INDIAN STANDARDS, the TECHNICAL SPECIFICATIONS contained herein and CODES referred to. Where the technical specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

v. Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain work or provide certain facilities, it is understood that the CONTRACTOR shall do so at his cost and the VALUE OF CONTRACT shall be deemed to have included cost of such performance and provisions, so mentioned.

vi. It will be Contractor's responsibility to bring to the notice of Engineer-in- charge any irreconcilable conflict in the contract documents before starting the work(s) or making the supply with reference which the conflict exists.

vii. In the absence of any specifications covering any material, design of work(s) the same shall be performed/ supplied/ executed in accordance with Standard Engineering Practice as per the instructions/ directions of the Engineer-in-charge, which will be binding on the Contractor.

3. PROCUREMENT

3.1.1 CONTRACTOR shall procure and supply all the materials other than OWNER supplied materials, required for permanent installation of pipeline and aboveground GI Installation in sequence and at appropriate time. All equipment, materials, components etc. shall be suitable for the intended service. Approved vendor list has been indicated in the bid package for various items. For items which are not covered in the vendor list, CONTRACTOR shall obtain Owner's prior approval for the vendor based on PTR document.

3.1.2 CONTRACTOR shall procure all materials, components, equipment, consumable etc. required for successful completion of the pipeline system. CONTRACTOR shall also procure and supply spares required for pre-commissioning and commissioning/ start up as recommended for all items supplied by him as per specifications provided in the bid package. Where no specification is available in the contract, the same shall be prepared by the CONTRACTOR based on the piping material specification / PNGRB (T4S for City or Local natural Gas Distribution Networks) and shall be subject to Owner's approval.

3.1.3 Material take-off with complete description of size, rating, material, thickness and specifications to be prepared by contractor.

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3.1.4 Only single offer shall be provided by the bidder fully complying to specifications/ drawings/ requirements for Owner's review and approval. CONTRACTOR shall provide for inspection of the items at vendor's works by the OWNER/ Owner's REPRESENTATIVE or by a reputed inspection agency and shall submit inspection reports for Owner's clearance.

3.1.5 Stores management including receipt, warehousing, preserving the material in good condition, issue of material to construction site, reconciling/ handing over surplus material to OWNER for OWNER supplied items.

3.1.6 Carryout proper documentation of inspection and quality assurance programs for all equipment and bulk materials duly approved by OWNER. CONTRACTOR shall maintain an accurate and traceable listing of procurement records for the location, quality and character of all permanent materials in the Project.

3.1.7 CONTRACTOR shall immediately report to the OWNER of all changes which will affect material quality, and recommend any necessary corrective actions to be taken.

3.1.8 Submit periodic progress reports highlighting hold ups and slippages, if any, to OWNER and take remedial measures.

3.1.9 Interact with authorities such as Sales Tax, Octroi, Excise, Customs etc. as necessary and arrange for transportation of the materials under his scope of supply to site.

3.1.10 All purchase requisitions including purchase orders shall be approved by Owner/ Owner's Representative.

3.1.11 Compliance with vendor's and supplier's instructions and recommendations for transportation, handling, installation & commissioning.

3.2 Construction

3.2.1 General

3.2.1.1 All construction works shall be carried out as per "Approved for Construction" drawings, procedures, specification and applicable codes and standards. Any changes at site shall also need prior approval from the OWNER and revision of drawings. Construction drawings will be submitted by the Contractor in a phased manner for Owner's approval in accordance with the procurement and construction plan prepared and furnished by contractor & agreed by Owner.

Owner will take minimum 7 working days from the date of submission of the documents / drawings submitted by the contractor for Owner's comments / approval.

3.2.1.2 Statutory Approvals

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The Owner shall provide to the Contractor the basic / in principal approval for laying the pipeline. However, the Contractor at his own initiative shall obtain all permissions, permits and licenses necessary for the performance of the work. If any such permission, permit or license required for the performance of the work by the contractor can only be granted at the request or recommendation of the Owner, the Owner shall at the request of the Contractor, provide recommendatory letters to the contractor to obtain or procure the same. The contractor shall not, however be entitled to any additional compensation over and above contracted rates of services for any hardship or increased cost caused by any idleness, suspension or disruption of work or any other account whatsoever as a result of the inability of the contractor to obtain the permission(s), permit(s), license(s) aforesaid to match with the progress of the work nor shall the same constitute a ground for extension of time.

a) The approval from any authority required as per statutory rules and regulations of Central/ State Government agencies etc. shall be the contractor's responsibility unless otherwise specified in the tender document. The application on behalf of the Owner for submission to relevant authorities along with copies of required certificates complete in all respects shall be prepared and submitted by the Contractor well ahead of time so that the actual construction/ commissioning of the work is not delayed for want of the approval/ inspection by concerned authorities. The Contractor shall arrange the inspection of the works by the authorities and necessary coordination and liaison work in this respect shall be the responsibility of the Contractor. However statutory fees paid, if any, for all inspections and approvals by such authorities shall be reimbursed at actual by the Owner to the Contractor on production of documentary evidence.

b) The defective work resulting from poor workmanship and/ or material supplied by contractor, as pointed out by any statutory authority shall be rectified by the contractor at no extra cost to the Owner. Any change/ addition required to be made to meet the requirements of the statutory authorities; the same shall be carried out by the contractor free of charge. The inspection and acceptance of the work by statutory authorities shall, however, not absolve the contractor from any of his responsibilities under this contract.

3.2.1.3 The Contractor shall comply with all the conditions and requirements issued by Authorities having jurisdiction in the area where the work is to be performed.

It shall be the Contractor's sole responsibility to make arrangements for land for setting up of its string fabrication yards, all storage areas for line pipe and other materials, wherever required, and all other work areas.

The Contractor shall make all arrangements for access to his work site at his own cost and responsibility. If no public road exists Contractor shall arrange on his own for access to his work area at no extra cost to the COMPANY.

The CONTRACTOR shall be responsible for claims if any arising out of damage/ obstruction to public utilities like lines of DOT etc. where the claims will cover the restoration costs as well as loss of revenue due to down time.

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3.2.1.4 Providing schedules, progress reporting, organization chart at construction site, quality assurance plan and developing quality control procedures, as per requirements indicated elsewhere in the bid package.

3.2.1.5 Coordination and supervising the work of sub-contractors.

3.2.1.6 Transportation of appropriate materials and taking delivery of Company supply materials, store, worksite, intermediate storage points, maintaining and operating an adequate material control procedure at worksite.

3.2.1.7 Fabrication of all GI piping, structural components as per approved drawings.

3.2.1.8 All civil/ structural works, electrical and instrumentation, laying and commissioning works shall be performed in accordance with relevant specifications and requirements enclosed elsewhere in the bid package.

3.2.1.9 CONTRACTOR shall provide complete details of manpower, equipment etc. to be deployed. Mobilizing and providing all equipment's, manpower (skilled and unskilled), consumable and other resources etc. for each spread as required for the execution of the complete job defined herein and thereafter demobilizing the same upon completion of work.

3.2.1.10 Provide, maintain and operate all temporary facilities required for the construction related works and remove after completion of work. Providing barricading at trench in city area as per instruction of engineer in charge for safety.

3.2.1.11 Hook up / tie-in of pipeline and piping system with other facilities etc.

3.2.1.12 All works related to cleaning, testing, dewatering, swabbing, drying, pre-commissioning and commissioning of the work tendered.

3.2.1.13 Idle time preservation of pipeline, if required.

3.2.1.14 All incidental and associated works and any other works not specifically listed therein but are required to be carried out to complete entire work related to pipelines and terminals.

3.2.2 Branch / service Pipeline

3.2.2.1 Familiarization of Pipeline Route

Bidders are advised to make site visits to familiarize themselves with all the salient features of available infrastructure along the proposed pipeline in concerned GA area (cities). Contractor shall be deemed to have considered all constraints and eventualities on account of site conditions while formulating his bid. Contractor shall not be eligible for any compensation in terms of cost and / or time, on account of site conditions varying to any extent from whatever described in the Bid Package.

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3.2.2.2 The city condition field / other fields may have lots of PVC, PE & utility pipelines or other pipelines & cables being used for city utility / other utilities purposes. CONTRACTOR shall ensure that these lines shall not be damaged/ cut affecting the water / power / communication / other supply to concerned Users / Owners / Authorities. Wherever required, temporary necessary precautions have to be maintained for uninterrupted supply.

3.2.2.3 Supply, loading, unloading, handling, stacking, storing and transportation to workshop/ work site of all materials that may be used for the construction of pipeline system at their designated stack yard/ dump site/ store and/ or by CONTRACTOR as the case may be.

3.2.2.4 Stacking, clearing, grading as required, trenching to all depths in all types of soil including soft & hard rock by chiseling or otherwise cutting etc. to a width to accommodate the PE pipeline as per relevant standards, drawings, specification etc. transportation of PE pipes along the route, stringing, aligning, bending, jointing including testing, inspection, field jointing including supply of all materials as per specifications, laying and lowering of the pipeline, back filling, Supply and installation of pipeline as shown in approved drawings and as directed by OWNER, installation of supports wherever required, supply of select backfill material as required, clean- up, flushing, pneumatic testing, nitrogen purging / pre-commissioning and commissioning of complete pipeline system, including all associated works as per relevant specifications, standards and approved drawings.

3.2.2.5 Sand / soft soil padding around pipe wherever required in areas where trenching has been done in hard soil area / rocky area including supply of sand/ soft soil. The thickness of sand/ soft soil padding at the top of pipe shall be minimum 150 mm and bottom of pipe shall be minimum 150 mm or as per drawing enclosed whichever is more.

3.2.2.6 Installation of all inline / online instruments / valves / fittings / transition fittings / appurtenances etc. as per requirements of approved drawings.

3.2.2.7 Testing & Purging

A) Testing

Pressure testing will be carried out with compressed air. Compressed air will be provided by Contractor for testing purposes and is to be included in the rates.

Measuring instruments shall have been calibrated and their accuracy and sensitivity confirmed. For testing of Network, calibrated pressure gauges of suitable range shall be supplied by the contractor. The pressure gauges shall be calibrated from time to time as desired by Engineer-in-Charge. All testing shall be witnessed and approved by the EIC or his delegated representative. Tie-in joints may be tested at working pressure following commissioning.

For service lines in some cases testing will be carried out for the test duration of 4 hrs. The service testing in this case will be performed after the service installation is complete but before the service tee

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has been tapped. Also, in some cases the tapping of the service tee will be delayed pending the completion and purging of the main pipelines.

B) Purging

Purging shall be carried out in accordance with the principles defined in the American Gas Association publication 'Purging Principles and Practice".

Nitrogen required for purging will also be provided by the Contractor. Nitrogen shall be supplied in labeled, tested and certified cylinders, and completed with all necessary regulators, hoses and connections, which will be in good condition and working order.

In addition, the Contractor shall submit and get approved a Purging Plan before commencing any purging work. The Plan shall include, but not be limited to, the provision of the following materials and equipment: Personal safety equipment, Fire extinguisher, purging adaptor, Purge stack with flame trap and gas sampling point, Gas sampling equipment (may be gas leak detector), squash-off tool, Polyethylene connecting pipe work.

The Plan shall also include the purging process along with detail on the sequence of events. The process is to also specifically mention the need to lay a wet cloth over the PE main and in contact with the ground, to disperse static electricity during the purging work.

A purge stack with flame trap shall be used when purging services. Care shall be taken to ensure that the purge outlet is so located that vent gas cannot drift into buildings.

3.2.2.8 Markers

Installation of all types of markers including all associated civil works. Any other work not specifically mentioned above but required for making the entire pipeline system ready for operation.

3.2.2.9 Priorities

The Contractor shall start the execution work as per approved execution methodology / plan / procedure to complete the scope of work and shall deploy adequate manpower, machinery, tool & tackles etc. accordingly.

However, Owner may, at its sole option, assign priority of construction to any part/ segment of the work. Contractor shall comply with such priority of execution and their deployment without any time and cost implication to the Owner.

3.2.2.10Pre-commissioning and Commissioning Assistance

- Pre-commissioning including supply of all materials, consumables and manpower of the complete pipeline system.

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- Making the entire system ready for commissioning and providing assistance during the complete duration of commissioning operations.

- Completion of all pipeline activities as detailed in SOR.

3.2.2.11Civil Works

Civil works shall be carried out as per scope mentioned at SOR and as per Indian Standard norms.

Any other work not specifically listed herein but required for the completion of the work.

3.2.2.12Installation of welded Riser and Lateral Pipes in High Rise Building for PNG connection

- Erection, Fabrication, Socket Welding of GI Pipes (heavy duty, as per IS-1239 Part-I duly Zinc coated in accordance with IS 4736) & wrought steel fittings (forged fittings, conforming to IS-1239 Part-II). The threading of GI pipe shall be NPT and conforming to ANSI B120.1

- Erection, Fabrication, Socket Welding, Testing & Installation of welded GI Pipes & Fittings etc., including NPT threading as per technical specification and sketch attached.

- Preparation and approval of sketches, schedules, execution procedures & WPS as per technical specification. All consumables e.g. electrodes, flux etc. for welding pipes and fittings are under contractor's scope.

- Supply & fixing of MS angle clamps, Ceiling clamps & dowel plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape / lock tight, Supply and fixing of studs & bolts of various sizes ranging from 1/2" to 2" and 3/4" to 2", Jointing of transition fittings to above ground GI pipes, purging, testing and commissioning of the complete installation.

- Welding of Riser is to be carried out in line with duly approved PQR / WPS.

- Galvanized (Zinc) coating shall be removed by light duty grinder or by any other suitable tool at both ends of riser pipe at about 25mm in length where welding is to be performed.

- The entire riser assembly shall be fabricated with socket welds both for threaded riser assembly and plain ended pipes. Threaded joints are permitted after first isolation valve on laterals where riser is not approachable from balcony and in case if riser is in approach of balcony within 300 mm gap from balcony laterals may be threaded with tee of welded riser on account of workability and future maintenance considerations

- Pipe and required fittings shall be first coupled with threaded (NPT) joints. The threaded joints to be made using male tapered thread and female parallel thread fittings.

- Teflon/PTFE Tape or any other joining compound shall not be used in threaded joints for welded riser. Alternatively plain ended pipes and fitting can also be used for welding in welded riser.

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- Risers and laterals must be designed to run through the optimal possible route, taking into consideration potential meter positions, design regulations and access for future maintenance. A riser must not be constructed so that the laterals face directly into the wall from the riser.

- Risers and laterals must be laid a minimum of 300 mm from any electrical equipment or installations. On occasions where the pipe has to cross over a cable, this has to be done at right angles and a minimum gap of 25 mm must be maintained between the pipe and cable. Consideration may be given to wrapping the pipe with electrical insulation tape for protection against electrical short circuiting.

- The riser shall be installed in a vertical line from its point of support to its highest point with a minimum of changes in direction. All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 mtrs. Maximum distance between clamps shall be 1.0 - 1.5 m when pipe goes to the straight, if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from center line of fittings at every sides. However, the same may be changed as per site conditions/as directed by EIC. Minimum gap between pipe & wall shall be 25 mm.

- Only pretested riser shall be erected using pulley. Pretesting shall be done with compressed air @ 2 bar (g) for minimum duration of 30 minutes.

- Supply and Installation of lateral GI pipes of 1/2" to 2" dia. from welded riser tapping TEE (Isolation Valve) to customer's kitchen appliances including NPT threading of GI pipes, supply of proper seal outs for threads to join fittings such as elbows, tees, connectors, regulators (free issue), meters (free issue), appliance & isolation valves etc., as per approved procedures and specification including clamping and sealing etc.

- The lateral extending from the riser at right- angles must extend a minimum of 400 mm from the riser before passing through a wall. Where the 400 mm length cannot be achieved, a flexible fitting such as stainless-steel hose (anaconda) shall be fitted.

- For the laterals beyond eighth floor, flexible Anaconda shall be used in compliance to the material specification of SS316, fittings shall be used with brass connections conforming to IS 319, in order to account for the temperature induced stresses.

- Where pipe passes through the balcony and the surface is slightly elevated around the service pipe or its surrounding, sleeves to be provided to prevent the accumulation of water at that point.

- Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.

- Risers and laterals shall be Leak tested with compressed air @ 2 bar (g) for minimum 2 hrs after vertical installation.

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- The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation
- Making temporary but stable platforms/scaffolding/rope ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.
- Any other material & activities not mentioned/covered above, but otherwise required for satisfactory completion/safety of work as defined in tender/bid has to be supplied / done by contractor within specified schedule at no extra cost to Owner.

4.1 **SCOPE OF SUPPLY**

4.2 Owner's Scope of Supply (Free Issue Item)

The Owner's scope of supply shall be limited to MDPE pipes, GI pipes (quantities as per the SOR), skids, meters, regulators, and other specified owner-supplied materials, as required. All other materials required for execution of the work shall be arranged by the Contractor unless otherwise specified in the Contract.

In addition to above, in order to speed up the project other Materials if available with Owner shall be issued on replacement basis to the Contractor from the designated store(s) of GAIL (I) Ltd. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

4.3 Material to be supplied by Contractor

The procurement and supply, in sequence and at the appropriate time, of all materials and consumables required for completion of the work as defined in this Bid document except the materials specifically listed above, shall be entirely the CONTRACTOR'S responsibility and item rates accepted for the execution of the CONTRACT shall be inclusive of supply of all these materials. The material to be supplied by the Contractor shall be as per specification and preferred make as indicated in Appendix-I or duly approved / recommended for use by GAIL (I) Ltd. / Site consultant. The materials will be, but not by way of limitations, as follows:

All materials except what is under Owner's scope of supply as mentioned in Clause No. 4.1 above, and required for successful completion of works in all respects shall be supplied by the Contractor and the cost of such supply shall be deemed to have been included in the accepted price without any additional liability on the part of Owner.

The following materials to be supplied by the contractor as required for completing the work. However other additional/ Supplementary materials required for execution of the project is to be supplied by the contractor.

Material under Contractor's Scope of Supply

A) **HDPE Casing Pipes PE 63/80, PN 6**

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i) HDPE Ducting Pipes (65mm)
ii) HDPE Ducting Pipes (75mm)

B) **Coupler / bends / elbows as required**

i) For 20mm (PE)
ii) For 32 mm (PE)

C) **End Caps**

i) Ends caps 20mm (PE)
ii) End cap 32mm (PE)

D) Equal Tee

i) Equal Tee 20mm OD (PE)
ii) Equal tee 32 mm OD (PE)

E) Saddle Tapping Tee

i) Saddle Tapping Tee 32x20 (PE)
ii) Saddle Tapping Tee 63x20 (PE)
iii) Saddle tapping Tee 63x32 (PE)

F) Reducer

i) Reducers 32x20 (PE)
ii) Reducers 63x32(PE)
iii) Reducers 125x63 (PE)

G) Transition Fitting

i) PE to G.I. (20 mm to 1/2")-01(Imp)
ii) PE to G.I. (32 mm to 1")

H) Warning mat

Warning Mat 300mm Wide-1mm Thick

I) GI Fittings

i) Elbows F End (½") (GI)
ii) Elbows F End (¾") (GI)
iii) Elbows F End (1") (GI)

iv) Elbows F End (1½") (GI)
v) M & F Elbows End (½") (GI)
vi) M & F Elbows End (¾") (GI)
vii) M & F Elbows End (1") (GI)
viii) M & F Elbows End (1½") (GI)
ix) Equal Tee (½") (GI)
x) Equal Tee (¾") (GI)
xi) Equal Tee (1") (GI)
xii) Equal Tee (1½") (GI)
xiii) Union (½") (GI)
xiv) Union (¾") (GI)
xv) Union (1") (GI)
xvi) Union (1½") (GI)
xvii) Sockets (½") (GI)
xviii) Sockets (¾") (GI)
xix) Sockets (1") (GI)
xx) Sockets (1½") (GI)
xxi) Reduced Elbows (¾" x ½") (GI)
xxii) Reduced Elbows (1" x ¾") (GI)
xxiii) Reduced Elbows (1½" x ¾") (GI)
xxiv) Reduced Elbows (1½" x 1") (GI)
xxv) Reduced Elbows (2" x 1½") (GI)
xxvi) Hex Nipple Size (½" x 2") Long (GI)
xxvii) Hex Nipple Size (½" x 3") Long (GI)
xxviii) Hex Nipple Size (¾" x 2") Long (GI)
xxix) Hex Nipple Size (1" x 2") Long (GI)
xxx) Hex Nipple Size (1½" x 2") long (GI)
xxxi) Reduced Sockets (¾" x ½") long (GI)
xxxii) Reduced Sockets (1" x ¾") (GI)
xxxiii) Reduced Sockets (1½" x ¾") (GI)
xxxiv) Reduced Sockets (1½" x 1") (GI)
xxxv) Reduced sockets (2" x 1½") (GI)
xxxvi) GI Plugs ¾"

Anaconda (flexible hoses) (lateral & riser buildings) (before meter)

a) 12mm dia.
b) 8mm dia.

Steel reinforced rubber hose (before burner)

a) 8mm dia.

Any other fittings not specified above but required for GI, Cu and PE lines is to be provided by the contractor other than any free issue materials provided by GAIL as mentioned in the SOR of the tender/bid documents.

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5.1 DOCUMENTS, SPECIFICATIONS, STANDARDS & DRAWINGS

5.2 Owner shall furnish tender/bid purpose drawings as listed in content of Volume-II of II of the tender/ bid document and other typical standard drawings attached with respective technical specifications enclosed with Volume-II of II of the tender/ bid document. Contractor shall prepare detail engineering drawing, bill of materials and all construction drawings and submit to consultant for approval prior to start of the job / any procurement.

5.3 Contractor shall prepare isometric drawings, any specific detail drawings (if required by Engineer-in-charge) & bill of materials and submit the same for Owner/ Consultant's approval / record.

Contractor shall prepare drawing for utilities line as required or as per SOR and submit the same for Owner/ Consultant's approval/ record.

5.4 No construction small or big shall be carried out without proper construction / standard drawings duly approved by Owner's Engineers at Delhi or site office or Owner's representative duly authorized to do so.

5.5 After Completion of construction & commissioning of pipeline system, Contractor shall incorporate all the correction in drawings, prepare and issue the drawings "as built drawings" as listed below to Owner as final submission of drawings. For pipeline alignment sheet, all block valve's location & details, pipe book etc. and for tap-off point & consumers premises, piping GAD, Isometric and all civil drawings including hook-up arrangement with Meter Regulator. For final submission only 4 sets of documents shall be handed over by Contractor. Any construction done by Contractor without duly approved drawings shall be wholly at his risk and cost. Contractor shall also submit soft copy of pipe book in excel along with hard copy. Soft copy of all as- built drawings shall be also submitted in AutoCAD.

5.6 Specifications

The work shall be carried out by CONTRACTOR strictly in accordance with the following specifications enclosed in Volume-II o II of this document: -

1) Laying of Underground PE Pipeline
2) Installation of Aboveground GI Piping for Domestic Consumers
3) PE Pipes
4) GI Pipe
6) HDPE Pipes
9) Warning mats
10) MDPE Fittings and Electro-fusion
14) Isolation valve & Appliance Valve
15) Health safety and environment
16) Quality Assurance

5.7 Drawings

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The drawings to the extent available are included in Vol.-II of the bid package for BIDDER's reference purpose only; Bidders are advised to go through these drawings and also visit the site before submitting their bids. The Contractor shall develop all drawings including for all crossings, along with the all-connection drawings required for construction works as detailed in respective SCC, PJS & SOR etc.

6.1 **RESOURCES / FACILITIES**

6.2 Recruitment of Personnel by Contractor

. The Contractor shall not recruit personnel of any category from among those who are already employed by the other agencies working at the sites but shall make maximum use of local labour available.

6.3 Construction Water and Power Supply

No water and power will be provided by the Owner. It should be the responsibilities of the contractor to arrange water and power at his own cost.

6.4 Land for Residential Accommodation

Owner shall not provide any land for residential accommodation of contractor's staff and labour.

7.1 PROJECT SCHEDULING & MONITORING

The following schedules/documents/reports shall be prepared and submitted by the Bidder/Contractor for review/approval at various stages of the contract.

7.2 Along with Bid

a) Time Schedule

The Completion Time Schedule for the work (including arc period) as per SCC Annexure- 3 of Tender/ bid in all respect, from the date of issue of Fax of Intent/Acceptance (FOA).

The Bidder is required to submit a Project Time Schedule in Bar Chart Form, along with the Bid. The Schedule shall cover all aspects like sub-ordering, manufacturing and delivery, indicated in the Bid Document. The Owner interface activities shall be clearly identified with their latest required dates. Owner reserves the right to disqualify the Bidder if the above Schedule submitted by the Bidder is not in line with the overall Project requirement.

b) Scheduling & Monitoring System

The Bidders should describe their system of Project Scheduling and monitoring, the extent of computerization, level of detailing, tracing methodology etc. with the name of computer package and sample outputs.

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7.3 After the Award of Contract

a) Overall Project Schedule

The Contractor shall submit within 1 week of Fax of Intent, a sufficiently detailed overall Project Schedule in the activity network form, clearly indicating the major milestones, interrelationship/ interdependence between various activities together with analysis of critical path and floats.

The network will be reviewed and approved by Engineer- in-Charge and the comments if any shall be incorporated in the network before issuing the same for implementation. The network thus finalized shall form part of the contract document and the same shall not be revised without the prior permission from Engineer-in- Charge during the entire period of contract.

b) Progress Measurement Methodology

The contractor is required to submit within 1 week of award of WORK, the methodology of progress measurement of sub-ordering, manufacturing/ delivery, sub- contracting construction and commissioning works and the basis of computation of overall services/physical progress informed. Owner reserves the right to modify the methodology in part or in full.

c) Functional Schedules

The contractor should prepare detailed functional schedules in line with network for functional monitoring and control and submit scheduled progress covers for each function viz. ordering, delivery and construction.

7.4 Project Review Meetings

The Contractor shall present the programme and status at various review meetings as required.

a) <u>Weekly Review Meeting</u>

Level of : Contractor's / Consultant's
RCM/ Participation Site In charge & Job Engineers.

Agenda: a) Weekly programme v/s actual achieved in the past week & program for next week.
b) Remedial Actions and hold up analysis.
c) Client query/ approval.

Venue : Site Office

b) Review Meeting

Level of : Senior Officers of GAIL (I) LTD. CMC and Participation Contractors.

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Agenda : a) Progress Status/ Statistics
b) Completion Outlook
c) Major holdups /slippages
d) Assistance required
e) Critical issues
f) Client query / approval

Venue : GAIL (I) LTD. /CMC Office/ Site at the discretion of Owner/ CMC

7.5 **Progress Reporting Performa**

A) Monthly Progress Report

This report shall be submitted on a monthly basis within 10 (ten) calendar days from cut-off date, as agreed upon covering overall scenarios of the work. The report shall include, but not limited to the following:

a) Brief Introduction of the work.
b) Activities executed / achievements during the month.
c) Schedule versus actual percentage progress and progress curves for Detail Eng. Sub-ordering, Manufacturing / Delivery, Sub- contracting, Construction, Commissioning and Overall and quantum wise status & purchase orders against schedule.
d) Area of concern/ problem/ hold-ups, impacts and action plans.
e) Resources deployment status.
f) Annexures giving status summary for drawings, MRs, deliveries, sub-contracting and construction.
g) Procurement status for items to be supplied by Contractor.

B) Weekly Reports

The report will be prepared and submitted by the Contractor on weekly basis and will cover following items:

a) Activities programmed and completed during the week.
b) Resource deployed men and machines.
c) Quantities achieved against target in construction
d) Record of Man-days lost.
e) Construction percentage progress schedule and actual.

C) Daily Repots

a) Activity programme for the day
b) Progress of the previous day and commutative progress.

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c) Manpower & machinery deployed.

7.6 PROGRESS REPORTS

7.5.1 CONTRACTOR shall make every effort to keep the OWNER adequately informed as to the progress of the WORK throughout the CONTRACT period.

CONTRACTOR shall keep the OWNER informed well in advance of the construction schedule so as to permit the OWNER to arrange for requisite inspection to be carried out in such a manner as to minimize interference with progress of WORK. It is imperative that close coordination be maintained with the OWNER during all phases of WORK.

7.5.2 By the 10th (tenth) of each month, CONTRACTOR shall furnish the OWNER a detailed report covering the progress as of the last day of the previous month. These reports will indicate actual and scheduled percentage of completion of construction as well as general comments of interest or the progress of various phases of the WORK. The frequency of progress reporting by the CONTRACTOR shall be weekly.

7.5.3 Once a week, CONTRACTOR shall submit a summary of the WORK accomplished during the preceding week in form of percentage completion of the various phases of the WORK, to the OWNER.

7.5.4 Progress reports shall be supplied by CONTRACTOR with documents such as chart, networks, photographs, test certificate etc. Such progress reports shall be in the form and size as may be required by the OWNER and shall be submitted in at least 3 (three) copies.

7.5.5 Contractor shall prepare daily progress report (DPR) in the desired format and submit it to Engineer-in-charge along with schedule of next day to Engineer-in- charge.

8.1 CONSTRUCTION

OWNER reserves the right to inspect all phases of CONTRACTOR's operations to ensure conformity to the SPECIFICATIONS. Owner will have Engineers, Inspectors or other duly authorized representatives, made known to the CONTRCTOR present during progress of the WORK and such representatives shall have free access to the WORK at all times. The presence or absence of a OWNER's representative does not relieve the CONTRACTOR of the responsibility for quality control in all phases of the WORK. In the event that any of the WORK being done by the CONTRACTOR or any SUB-CONTRACTOR is found by OWNER's representatives to be unsatisfactory or not in accordance with the DRAWINGS, procedures and SPECIFICATIONS, the CONTRACTOR shall, upon verbal notice of such, revise the work in a manner to conform to the relevant DRAWINGS, procedures and SPECIFICATIONS.

8.2 Rules & Regulations

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CONTRACTOR shall observe in addition to Codes specified in respective specification, all National and Local Laws, Ordinances, Rules and Regulations and requirements pertaining to the WORK and shall be responsible for extra costs arising from violations of the same.

8.3 Procedures

Various procedures and method statements to be adopted by CONTRACTOR during the construction as required in the respective specifications shall be submitted to OWNER in due time for APPROVAL. No such construction activity shall commence unless approved by OWNER in writing.

8.4 Field Inspection

CONTRACTOR shall have at all times during the performance of the WORK, a Competent Superintendent on the premises. Any instruction given to such superintendent shall be construed as having been given to the CONTRACTOR.

8.5 Erection and Installation

The CONTRACTOR shall carry out required supervision and inspection as per quality Assurance plan and furnish all assistance required by the OWNER in carrying out inspection work during this phase. The OWNER will have engineers, inspectors or other authorized representatives present who are to have free access to the WORK at all times. If an OWNER's representative notifies the CONTRACTOR's authorized representative not lower than a Foreman of any deficiency, or recommends action regarding compliance with the SPECIFICATIONS, the CONTRACTOR shall make every effort to carry out such instructions to complete the WORK conforming to the SPECIFICATIONS and approved DRAWINGS in the fullest degree consistent with best industry practice.

8.6 Construction Aids, Equipment, Tools & Tackles

CONTRACTOR shall be solely responsible for making available for executing the work, all requisite Construction Equipment's, Special Aids and Tools, Tackles and testing equipment's and appliances. Such construction equipment's etc. shall be subject to examination by Owner and approval for the same being in first class operating condition. Any discrepancies pointed out by OWNER shall be immediately got rectified, repaired or the equipment replaced altogether, by CONTRACTOR. OWNER shall not in any way be responsible for providing any such equipment, machinery, tools and tackles.

The OWNER reserves the right to rearrange such deployment depending upon the progress and priority of work in various sections.

Tie-end between main line and starting point of terminal is included in the scope of contract, as and when main line section is available for Tie-ins.

9.1 **DOCUMENTATION**

9.2 As - Built Drawings

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Notwithstanding the provisions contained in standard specifications, upon completion of commissioning, the BIDDER shall complete all of the related approved drawings along with bill of materials to the "AS BUILT" stage provide to a scale of 1:200 and submit to GAIL (I) LTD., the following:

a) One complete set in reduced size (279 mm x 432 mm).
b) One complete set of Soft Copy in portable drive of all original drawings.
c) Four complete sets of approved prints in A2 / A3 sizes.

9.3 Completion Document

The following documents shall be submitted in hard binder by the BIDDER in one set for GAIL (I) site office in original and one set for GAIL (I), NOIDA, as a part of completion documents: -

a) Copies of the Inspection reports, Laying Graphs, HDD Profiles (if required) and valve pit drawings (if required).
b) Pre testing, final Hydrostatic / pneumatic and other Test results and reports.
c) Consumption statements of PE / GI certified by Owner's Site Engineer.
d) Material Reconciliation, stores issue & return statements
e) All other requirements as specified in the respective specifications.
f) Completion Certificate issued by Owner's Site Engineer.
g) No claim certificate by the BIDDER.
h) Completion certificate for embedded and covered up works wherever applicable.
i) Recovery statement, if any.
j) Deviation statement.
k) Statement for reconciliation of all the payments and recoveries made in the progress bills.
l) Copies of deviation statement and order of extension of time, if granted.
m) Any other contractual documents required on completion.
n) Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given / completed.
o) The details recorded in measurement cards of every domestic house.
p) Details of houses where extra piping done along with materials used.
q) Total material consumption report.
r) Material reconciliation with respect to the materials issued.
s) Test reports & test certificates of gauges etc.
t) Any other documents / records required.

10.1 **SURVEY AND LEVEL / SETTING OUT WORK**

10.2 Before the WORK or any part thereof are begun, the CONTRACTOR's agent and the Engineer-in-Charge's representative shall together survey and take levels of the SITE and decide all particulars on which the survey is to be made, and on which measurements of the WORK are to be based. Such particulars shall be plotted by the CONTRACTOR and after agreement the drawings shall be signed by the Engineer-in-Charge.

10.3 The CONTRACTOR shall be entirely responsible for the horizontal and vertical alignment, the level and correctness of every part of the WORK and shall rectify any errors or imperfections therein. Such

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rectifications shall be carried out by the CONTRACTOR at his own cost, when instructions are issued to this effect by the Engineer-in-Charge or his representative.

10.4 The Engineer-in-Charge shall furnish the relevant existing grid point with Bench Mark on the land. It shall be CONTRACTOR's responsibility to set out the necessary control points in and to set out the alignment of the various works. The CONTRACTOR shall have to employ efficient survey team for this purpose and the accuracy of such setting out work shall be CONTRACTOR's responsibility.

10.5 The CONTRACTOR shall give the Engineer-in-Charge not less than 24 (twenty four) hours notice in writing of his intention to set out or give levels for any part of the WORK so that arrangements may be made checking the same.

10.6 WORK shall be suspended for such times as necessary for checking lines and levels on any part of the WORK.

10.7 The CONTRACTOR shall at his own expense provide all assistance, which the Engineer-in-Charge may require for checking the setting out of WORKS.

10.8 Before commencement of any activity, contractor's quality control set up duly approved by company must be available at site.

11.1 **ORDER OF WORKS / PERMISSIONS / RIGHT OF ENTRY / CARE OF EXISTING SERVICES**

11.2 The order in which the WORK shall be carried out shall be subject to the approval of the Engineer-in-charge and shall be so as to suit the detailed method of construction adopted by the CONTRACTOR, as well as the agreed joint programme. The WORK shall be carried out in a manner so as to enable the other contractors, if any, to work concurrently.

OWNER reserves right to fix up priorities which will be conveyed by Engineer-in-Charge and the CONTRACTOR shall plan and execute work accordingly.

11.3 Existing Service

11.3.1 Drains, pipes, cables, overhead wires and similar services encountered in course of the works shall be guarded from injury by the CONTRACTOR at his own cost, so that they may continue in full and uninterrupted use to the satisfaction of the Owners thereof, or otherwise occupy any part of the SITE in a manner likely to hinder the operation of such services.

11.3.2 Should any damage be done by the CONTRACTOR to any mains, pipes, cables or lines (whether above or below ground etc.), whether or not shown on the drawings the CONTRACTOR must make good or bear the cost of making good the same without delay to the satisfaction of the Engineer-in-Charge.

12.0 **MAKE OF MATERIAL / BOUGHT OUT ITEMS**

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Approved vendors for various major items are enclosed as Appendix-I to Particular Job Specification with this tender/ bid document. The bidder shall consider such names only as indicated in the aforesaid list and clearly indicate in the bid the name(s) as selected against these items. For any other item not covered in the list enclosed with this tender/ bid document, prior approval shall be obtained by the contractor from GAIL/ GAIL Authorized site consultant for its make/ supplier's name.

13.0 INSPECTION OF SUPPLY ITEMS

All inspections and tests shall be made as required by the specifications forming part of this contract. Contractor shall advise Owner/ Consultant in writing at least 10 days in advance of the date of final inspection/tests. Manufactures inspection or testing certificates for equipment and materials supplied, may be considered for acceptance at the discretion of Owner/ Consultant. All costs towards testing etc. shall be borne by the contractor within their accepted rates. All inspection of various items shall be carried out based on Quality Assurance Plan, which will be submitted by the Contractor and duly approved by Owner/ Consultant.

14.0 ESCALATION

The Unit Rates accepted shall be kept firm till completion of work and no price Escalation shall be paid.

15.0 DOCUMENTS TO BE SUBMITTED / PRODUCED ALONGWITH R.A. BILLS

Refer 'the checklist' for details of the documents to be submitted. Checklist duly signed will become part of RA bill.

16.0 INSURANCE FOR FREE ISSUE MATERIAL

Insurance for Free Issue Material

Contractor shall at his own expense arrange, secure and maintain insurance cover for Owner's supplied free issue materials as defined in Tender/ bid Document of adequate value as intimated by Owner / consultant. Contractor's awarded price shall be inclusive of all costs on account of insurance liabilities covered under the Contract. Contractor shall note that the beneficiary of insurance cover shall be GAIL (I) Ltd. The approximate cost of free issue material of this tender/ bid quantity is as given below:

Contract Type	Cost In INR
For Contract Award Value up to ₹25 Lakh	₹7.50 Lakh
For Contract Award Value up to ₹50 Lakh	₹15.0 Lakh

The contractor shall obtain the applicable insurance before the issuance of free-issue materials.

16.2. Insurances in India

16.2.1 Contractor shall at his own expense arrange, secure and maintain insurance with Indian insurance companies to the satisfaction of the Owner as may be necessary and to its full value for all such amounts to protect the works in progress from time to time and the interest of Owner against all risks as detailed herein. The form and the limit of such insurance as defined herein together with the under writer works thereof in each case should be as acceptable to the Owner. However, irrespective of work acceptance the responsibility to maintain adequate insurance coverage at all times during the period of Contract

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shall be that of Contractor alone. Contractor's failure in this regard shall not relieve him of any of these responsibilities and obligations under Contractor.

16.2.2 Any loss of damage to the equipment during inland transportation, storage, erection and commissioning till such time the Work is taken over by Owner shall be to the account of Contractor. Contractor shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/ or replacement of the parts of the Work damaged or lost. Contractor shall provide the Owner with a copy of all insurance policies and documents shall be submitted to the Owner immediately upon the Contractor having taken such insurance coverage. Contractor shall also inform the Owner regarding the expiry cancellation and/ or changes in any of such documents and ensure revalidation/ renewal etc., as may be necessary well in time.

16.2.3 The risks that are to be covered under the insurance shall include, but not be limited to the loss or damage in handling, transit, theft, pilferage, riot, civil commotion, weather conditions, accidents of all kinds, fire, war risk etc. The scope of such insurance shall cover the entire value of supplies of equipment's, plants and materials.

16.2.4 All cost on account of insurance liabilities covered under this Contract will be to Contractor's account and will be included in Contract Price. However, the Owner may from time to time, during the currency of the Contract, ask the Contractor in writing to limit the insurance coverage risk and in such a case, the parties to the Contract will agree for a mutual settlement, for reduction in Value of Contract to the extent of reduced premium amounts.

Contractor as far as possible shall cover insurance with Indian Insurance Companies.

17.1 SPECIAL POINTS PERTAINING TO SPECIFICATION

The technical specification & safety standards as prescribed in PNGRB is to be followed further

The minimum pipeline cover shall be kept as follows:

Pipeline Burial Requirement

The entire pipeline shall be buried and provided with a minimum cover as given in Table below:

Pipeline Burial Requirements	
Location	**Min. Cover (m)**
a) minor water crossing (below firm bed level)	1.5
b) Cased/ Uncased Road/ cart track crossings	1.2
c) Drainage, ditches at roads crossings	1.0
d) Residential and other locations including rocky areas	1.0

Note:

i) The depth of cover shall be measured from the top of the pipe to the top of the undisturbed surface of soil or the top of graded working strip, whichever is lower. The fill material in the working strip shall not be considered in the depth of cover.

ii) The cover shall be measured from the top of road or top of rail, as the case may be.

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iii) For water courses that are prone to scour and erosion, adequate safe cover as mentioned above or as advised by concerned authorities (whichever is stringent) shall be provided below the predicted scour profile expected during the life time of the pipeline.

iv) When scour level is not known, an additional cover of at least 1 m or as advised by concerned authorities shall be provided from the existing firm bed of the river / water course except in case or rocky river bed;

v) Minimum cover mentioned above against Sl. no. a), b), c), d) & e) category may be increased based on the statutory requirements from concerned authorities and requirement shall be final and binding to the contractor.

vi) soft soil / sand padding of minimum 150 mm thickness or as mentioned in standard drawing (whichever is stringent) to be provided around the pipeline where gravel / hard soil or rocky area if encountered.

- Piping at consumer ends, connection at existing tap-off location and for future connections along with bill of materials.

  Contractor shall develop General Arrangement Drawings (GADs) good for construction for size 32 / 20mm and locations based on typical sketches/ drawings along with bill of materials and submit to Owner for reviews/ approval. Construction work shall be carried out based on construction drawings duly approved by Owner/ Consultant.

- The detailed engineering for above ground installation shall include detail engineering pertaining to all disciplines (if required) along with bill of materials.

- All the documents/ drawings prepared by the Contractor shall be submitted to Owner/ Engineer-in-charge for review and approval. All works shall be executed based on the approved drawings/ documents only.

- Contractor shall obtain all clearance from Government authorities (if required). However, bank guarantee/ required fee or charges shall be submitted by Owner.

17a. If any ambiguity arises between SCC (Tech.) & Particular Job Specification in that case later shall govern. However, in some cases, decision of Engineer-in-charge shall be final and binding to the contractor.

17b **Following points shall be taken care by the contractor before during execution works.**

i) Contractor shall be responsible for taking necessary precautions regarding traffic (installation of notice / warning boards).

ii) Contractor shall be totally responsible for the occurrence of any accident during excavation of road and shall be liable for damages / expenses due to the same.

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iii) Concerned authority / Owner shall not be responsible for any loss / damage.

iv) One copy of the permission shall be made available with contractor's responsible workman (if required) at the place where excavation is undertaken.

v) While executing the subject work, excavation shall be done in consultation with the concerned authority engineer of that area.

vi) Necessary safety measures shall be taken for the gas pipeline, since high tension lines and other services carriers are running along with in gas pipeline route in the area.

17c **Additional Clause**

17c.1 Contractor to note that the minimum requirements of inspection and testing of the bought- out items shall be governed by attached QAP with the tender/ bid document. However, contractor shall submit their QAP in line with the requirement specified in attached QAP for Owner's/ CMC's approval.

17c.2 Contractor to note that all the documents/drawings submitted by them as a part of bid shall be considered only to assess Bidder's technical capability and shall in no way absolve them from complying with all the requirements of the Tender/ bid. All works to be performed by the Bidder shall be strictly in accordance with tender/ bid conditions.

17c.3 Contractor shall submit duly signed & stamped hard copies of all required documents/ drawings/ data sheets etc. to CMC for their review & approval as per terms & condition of tender/ bid documents. The date of receipt of these documents/ drawings/ data sheets etc. at CMC shall be deemed as the date of submission. If any documents/ drawings/ data sheets etc. require re-submission due to any error/ deficiency noticed during review/ approval stage, in that event the additional time required by the contractor to get the revised document/ drawing reviewed/approved by CMC shall be solely to contractor's account and in no case, contractor shall be entitled for any time or cost benefit.

17c.4 The drawings/documents/ data sheets etc. shall be reviewed, checked, approved and duly signed/stamped by successful contractor before submission. Revision number shall be changed and revisions shall be highlighted by clouds during submission of revised documents/drawings/data sheets by the successful contractor. Whenever the successful contractor requires any sub-supplier drawings to be reviewed/approved by CMC, the same shall be submitted by the contractor after review/ approval and stamped by the Contractor. Direct submission of the sub-supplier's drawings/documents/data sheets etc. without contractor's approval shall not be entertained.

17c.5 Review/Approval of the contractor's submitted drawings/ documents/ data sheets etc. by CMC would be only to review the compatibility with basic design and concepts including construction work

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procedure and in no way absolve the successful contractor of his responsibility/contractual obligation to comply with tender/ bid requirements, applicable codes,
specifications and statutory rules/regulations. Any error/deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the contractor without any extra cost or time, whether or not comments on the same were received from CMC during the drawing review stage.

Inspection/ Site supervision as per QA/QC of the contractor's carried out works and their supplied material etc. at site by CMC/consultant would be only to inspect / supervise the activities/works randomly to check the compatibility with the requirement of technical specification of the Contract document and in no way absolve the successful contractor of his responsibility/contractual obligation to comply with contract document requirements, applicable codes, specifications and statutory rules/regulations. Any error/deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the contractor without any extra cost or time, whether or not observation/comments on the same were received from CMC/consultant either in inspection report / work procedure during the construction works to commissioning stage.

17c.6 Contractor shall make & maintain their own suitable sized Storage yard/ area (covered as well as open space) to store Free Issue Materials (FIM) in proper manner. Contractor shall also maintain the FIM in good condition during entire storage period by using all type of servicing/overhauling such as cleaning, greasing, protecting from rusting/ pitting etc.

17c.7 Storage Yard/ Area shall have proper motorable approach, adequate indoor & outdoor area lighting, potable & service water, proper rack & wooden sleeper etc. for staking/ storing the material, availability of material handling equipment of adequate capacity etc.

Owner/CMC's Site In-charge shall visit & inspect the Contractor's Storage yard/ Area and upon his concurrence only, the FIM shall be stored by the Contractor at the particular Storage Yard/ Area.

Delay in issuance of FIM due to non-acceptance of Contractor's Storage yard/Area i.e. mainly because of noncompliance of the minimum condition as Mentioned Above for Storage Yard/ Area) shall not be attributable to Owner / consultant.

17c.8 During construction, Owner / CMC/consultant, on their discretion, have reserve right to take samples for any bought-out item received at site and test the same in a NABL approved or equivalent laboratory even if the lot has already been Inspected and cleared by CMC/Consultant / Owner for use in construction. The cost for such testing shall be borne by the Contractor. In case of failure of the samples, the lot shall be rejected and the same shall be replaced by the Contractor without any additional cost to Owner.

18.0 **General note to contractor:**

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Contractor shall maintain a Project site office, Material store with following facilities:

- Telephone/ Mobile phones, Printers/Scanning/Xerox machines, Computer with internet facility

- 1 No. air-conditioned four-wheeler reasonably in good condition with valid license holder driver for site survey, meetings at site, etc. to be kept for Owner/Owners representative. Also, it shall be well equipped with tools and tackles for attending any emergency complaints and ongoing execution work.

19. **CASING PIPE TECHNICAL SPECIFICATION FOR LAYING OF PE MAIN PIPELINES AND SERVICE PIPELINES Shall be read as-**

The tentative sizes of the HDPE casing pipe for Moling/ HDD shall be as follows: -

Size of PE pipe	Size of HDPE pipe
20 mm	50mm
32 mm	75 mm
63 mm	125 mm
90mm	180mm
125mm	250mm

20.0 **TECHNICAL SPECIFICATION FOR INSTALLATION OF ABOVE GROUND GI /CU PIPING FOR DOMESTIC, COMMERCIAL AND INDUSTRIAL CONSUMERS Shall be read as-**

Installation of GI pipes of ½", ¾", 1" dia. between transition fittings (installed by PE contractor) and customer's kitchen which would include NPT threading of pipes, and jointing of fittings such as elbows, tees, connectors, regulators, meters, isolation valves etc., as per laid procedures and specification including supply of GI fittings & Teflon tapes for sealing of joints. Painting of GI Pipes & fittings as per specification.

Installation of CS pipes of 1½" & 2" dia. complete along with all associated works between transition fittings (installed by PE contractor) and battery limit of Commercial & Industrial Consumer's premises shall be carried out as per separate TS [i.e. SPECIFICATION FOR PIPING FABRICATION AND ERECTION SPECIFICATION]. Painting of CS Piping system along with fittings, flanges, valves & equipment's as per specification.

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APPENDIX-I

List of Manufacturer / Supplier for Bought Out Items (Mechanical & Fire Fighting Equipment)

LIST OF PREFERRED MANUFACTURER/SUPPLIER FOR BOUGHT OUT ITEMS

PE FITTINGS & PE VALVES

1) M/s Friatech AG, Germany (represented by M/s Sherman Sales in India)
2) M/s Jain Irrigation Systems Ltd. Jalgaon (Fusion, UK)
3) M/s George Fisher
4) M/s Plasson Ltd.
5) M/s Agru, Australia
6) M/s Kimplas, Nasik (PE Fittings only)
7) M/s Innogaz & M/s Frialen of M/s Aliaxis Utilities & Industry Pvt. Ltd. (formerly Glynwed pipe systems)
8) M/s.Al-Aziz Plastics Pvt Ltd Mumbai
9) M/s Kimplas Piping Systems ltd., Nashik
10) M/s Aliaxis Utilities & Industry Pvt. Ltd (Formerly Glynwed pipesys-tems)

HDPE PIPES & HDPE DUCT

1) M/s Climax Synthetics (P) Ltd., Vadodra
2) M/s Indian Poly Pipes, Calcutta
3) M/s Jain Irrigation Systems Ltd., Jalgaon
4) M/s Kirti Industries (India) Ltd., Indore
5) M/s Ori Plast Limited, Calcutta
6) M/s Phoel Industries Limited, Delhi
7) M/s Sangir Plastics (P) Ltd., Mumbai
8) M/s Veekay Plast, Jaipur
9) M/s Kisan Irrigation
10) M/s Dutron Polymers Ltd.
11) M/s Manikya Plastichem (P) Ltd
12) M/s Mangalam Pipes Pvt. Ltd., Bengaluru
13) M/s Shand Pipe industry Pvt. Ltd., Bengaluru
14) M/s Varun Pipes Pvt. Ltd., Bengaluru
15) M/s EPP Composite Pvt. Ltd., Rajkot
16) M/s DM Engineering Co., Mumbai
17) M/S EONNPLAST INDIA PVT LTD Noida
18) M/S EPP Composite Pvt. Ltd. Rajkot
19) M/S Sangir Plastics Pvt Ltd Mumbai
20) M/s Goodluck steel tubes ltd, Ghaziabad
21) M/s Indus tubes ltd, New Delhi
22) M/s Jindal pipes ltd, New Delhi / Bengaluru
23) M/s Jyotindra steel & tubes ltd, Firozabad

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24) M/s Rama Steel tubes ltd, New Delhi
25) M/s Surya Roshni ltd, Bhadurgarh
26) M/s Vishal Pipes Ltd. New Delhi
27) M/s Advance Steel Ltd. New Delhi
28) M/s Swastik Pipe Ltd, New Delhi / Bengaluru
29) M/s Indian seamless metal tubes ltd., Pune
30) M/s Appolo tubes., Bengaluru
31) M/s Fortune Pipes Ltd
32) M/s Nezone Tubes Ltd., Kolkata
33) M/s. Godavari Polymers Pvt. Ltd. Secunderabad.

GI PIPES

1) M/s Surya Roshni Ltd, Bhadurgarh
2) M/s Vishal Pipes Ltd.
3) M/s Indus Tubes Ltd, New Delhi
4) M/s Jindal Pipes Ltd, New Delhi
5) M/s Jyotindra Steel & Tubes Ltd, Firozabad
6) M/s Rama Steel Tubes Ltd, New Delhi
7) M/s Advance Steel Ltd.
8) M/s Swastik Pipe Ltd.
9) M/s Fortune Pipe Ltd.
10) M/s Indian Seamless Metal Tubes Ltd., Pune
11) M/s Appolo Tubes, Bengaluru
12) M/s Nezone Tubes Ltd., Kolkata
13) M/s Topworth Pipes & Tubes Pvt. Ltd., Navi Mumbai
14) M/s P.S Steel Tubes Limited
15) M/s Riddhi Steel And Tube Limited
16) M/s Apl Apollo Tubes Limited

WARNING MAT

1) M/s Sparco Multiplast Pvt. Ltd., Ahmedabad
2) M/s Singhal Industries, Ahmedabad
3) M/s Raychem RPG Ltd.
4) M/s Puja Packings, Mumbai
5) M/s Bina Enterprises, Mumbai
6) M/s Shree Vijay Wire & Cables Industries, Jaipur

GI FITTINGS

1) M/s Jainsons Industries, Jalandhar
2) M/s Jupiter Metal Industries Ltd.
3) M/s Rajnesh Malleables Ltd., Delhi
4) M/s Industrial Valves & Components, Delhi

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5) M/s Sarin Industries, Delhi
6) M/s Excel Metal & Engineering Industries, Mumbai
7) M/s Modern Stores & Engineering Concern, Kolkata
8) M/s Jinan Meide Casting Co. Ltd., China
9) M/s Mehta Brother & Co., Mumbai- (Make: M/s Jinan Meide Casting Co. Ltd., Japan) confirming to IS 1879:2010 latest standard
10) M/s Chokhawala Distributors
11) SHAKTI FORGE INDUSTRIES PVT. LTD
12) M/s Green Manufacturing Co. Limited, Jalandhar, Punjab (For ½" Elbow, ½" Male female Elbow, ¾" Elbow, ½" Equal Tee, ½" Socket only)

COPPER TUBES AND COPPER FITTINGS

1) M/s Paras Industries Ltd.
2) M/s Rajco Metal
3) M/s Chandan Enterprises
4) M/s Mehta Tubes
5) M/s Cofit Industries, Bengaluru
6) M/s Mandev Tubes
7) M/s Sagardeep Alloys
8) M/s Pallavi Copper Pipes
9) M/s Janya Extrusions Pvt Ltd, Mumbai

BRASS FITTINGS

1) M/s Chandan Enterprises
2) M/s Paras Industries Ltd.
3) M/s Umesh Enterprises
4) M/s Om brass Enterprises
5) M/s KPC Flexi Tubes
6) M/s Mehta Bros, Mumbai
7) M/s Mehta Tubes, Mumbai
8) OM Brass Industries

FLEXIBLE HOSE (ANACONDA)

1) M/s KPC Flex Tubes
2) M/s Vestas Hose Division
3) M/s Alfa Flexitubes
4) M/s Bengal Industries Pvt. Ltd.
5) M/s Vikram & co.
6) M/s Gaytri Industrial Corporation, Thane (W)
7) AEROFLEX INDUSTRIES LTD
8) FLEXATHERM EXPANLLOW PVT LTD
9) ALFA FLEXITUBES PVT LTD

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PE PIPES

1) M/s Jain Irrigation System Ltd., New Delhi
2) M/s Pennwalt Agru Plastics Ltd., Navi Mumbai
3) M/s Pioneer Polyfeb Ltd. Ghaziabad
4) M/s Kriti Industries (i) Ltd., Indore
5) M/s Ori Plast Ltd., Kolkata
6) M/s.Purma Plast Pvt Ltd, Rajasthan

ISOLATION (PE) VALVES

1) M/s Friatech AG, Germany
2) M/s George Fisher, Germany
3) M/s Plasson Ltd., Israel
4) M/s Agru, Austria
5) M/s Aliaxis Utilities & Industry Pvt. Ltd (Formerly Glynwed pipesystems)

METERS AND REGULATORS

1) M/s Actaris Metering System, New Delhi
2) M/s Elster Messtechnik Gmbh, Lampertheim
3) M/s Emerson Process Management (India) Pvt. Limited, Mumbai
4) M/s Equimeter Inc., USA
5) M/s Gorter Controls B.V., Netherlands
6) M/s Instromet International, Belgium
7) M/s Invensys Metering Systems India Ltd., Pune
8) M/s Mesura SA, France
9) M/s Pietro Fiorentini S.p.A, Italy
10) M/s RMG Regal – Messtechnik Gmbh, Germany
11) M/s Raychem RPG Limited, Kolkata
12) M/s Rockwin Flowmeter India Pvt. Ltd., New Delhi
13) M/s Itron India Pvt. Limited, Noida
14) M/s. Daniel Solutions Pvt. Ltd. Gurgaon
15) M/s. Capital Innotech Private Limited
16) M/s.Genus Power Infrastructures Limited
17) M/s.Greenglobe Fuel Solutions Private Limited
18) M/s.Kimpex Flow Private Limited
19) M/s.Mesura Nirmal Gas Controls Pvt Ltd
20) Pietro Fiorentini Db India Private Limited

STEEL REINFORCED RUBBER HOSE

1) M/s Suraksha Products Pvt. Ltd.
2) M/s Vansh Industries

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3) M/s T &L Gases
4) M/s Vikram & Co.
5) M/s Gayatri
6) M/s Luxmi Rubtech

ISOLATION VALVES AND APPLIANCE VALVES

1) M/s Universal Srl
2) M/s Tiemme Raccorderie Sede
3) M/s Jainson Industries
4) M/s Enolgas Bonimu s.a.s.
5) M/s Fratelli Fortis s.r.l
6) M/s Giacomo Climbrio
7) M/s Parker Hannifin S.P.A.
8) M/s Singapore Valve & Amp; Fittings Pte Limited, Singapore
9) M/S Rubinetterie Utensilerie Bonomi (RUB)
10) M/s Zhegiang Valogin Technology Co. Ltd. , China
11) M/s Ningbo Huaping Metalwork Co. Ltd., China
12) M/s Mehta Brothers, Mumbai.
13) M/s Chokhawala Distributors
14) M/s Zhejiang DunAn valve Co.Ltd, China

PAINT

1. M/s Asian Paints
2. M/s Berger Paints
3. M/s Kansai Nerolac Paints.
4. Durolac paints

PIPE CARBON STEEL TO INDIAN STANDARDS

1. A.S.T.Pipes Pvt. Ltd.(Ast Group)
2. Advance Steel Tube Ltd.
3. Apl Apollo Tubes Ltd.(Er.Bihar Tubes Ltd.
4. Asian Mills Pvt.Ltd.
5. Asrani Tubes Limited
6. Dadu Pipes(P) Ltd.
7. Essar Steel Limited (Erhazira Pipes Mill)
8. Gaurang Products Pvt Ltd.(Ast Group)
9. Goodluck Steel Tubes Ltd.
10. Hi-Tech Pipes Limited
11. Indus Tube Limited
12. Jindal Industries Ltd
13. Jindal Pipes Ltd.
14. Jindal Saw Ltd(Kosi Works)
15. Jotindra Steel & Tube Ltd

16. Lalit Pipes And Pipes Ltd.
17. Maharashtra Seamless Ltd.
18. Man Industries(India) Ltd.–Pithampur
19. Man Industries(India) Ltd.Anjar
20. Mukat Tanks & Vessels Ltd.
21. Nezone Tubes Limited
22. North East Erntubes Limited
23. Pratibha Industries Limited
24. Pratibha Pipes & Structural Ltd.
25. Pslltd(Chennai)
26. Pslltd(V1,V2&Nc)
27. Rama Steel Tubes Ltd.
28. Ratnamani Metals And Tubes Ltd.
29. Ravindra Tubes Limited
30. Samshi Pipei Ndustries Limited
31. Surya Roshni Ltd.
32. Swastik Pipes Ltd.
33. Utkarsh Tubes & Pipes Ltd.(Formerly Bmw)
34. Zenith Birla(India)Limited

PIPE & TUBULARS TO A.P.I. STANDARDS

1. Arcelor Mittal Tubu-Lar Product Sro-Mansa, Romania
2. Bhel(Trichy), India
3. Dalmine Spa(Enquiry To Tenaris),Uae
4. Eew Korea Co. Ltd(Germany),Korea
5. Eew Korea Co. Ltd.(Korea), Korea
6. Eisenbau Kramer Gmbh,Germany
7. Hyundai Rbco. Ltd. South Korea
8. Ilva Lamiere E Tubi Srl(Enq To Ilva Spa,Italy)
9. Inox Tech. Spa, Italy
10. Ismt Ltd.Ahmedngr, India
11. Ismt Ltd. Baramati, India
12. Jinda Lpipes Ltd., India
13. Jindal Saw Ltd.(Kosi Works), India
14. Jindal Saw Ltd.(Nashik Works), India
15. Lalit Pipes And Pipes Ltd., India
16. Maharashtra Seamless Ltd., India
17. Man Industries (I) Ltd.(Pithampur),India
18. Mukat Tanks &Vessels Ltd.,India
19. Pratibhaindustrieslimited,India
20. Ratnamani Metals And Tubes Ltd.,India
21. Siderca S.A.I.C (Enquiry To Tenaris),Uae
22. Sumitomo Metal Ind.Ltd.,India
23. Surya Roshni Ltd.,India
24. Swastik Pipes Ltd,India

GAIL_Internal

25. Tata Steel Uk Limited(Formerly C702)
26. Tubos De Acero De Mexico Sa(Enq.Tenaris),Uae
27. Tubos Reunidos Sa Spain
28. Umran Steel Pipe Inc(Turkey),Turkey
29. Valcovny Trub Chomutov, Czech Republic
30. Vallourec And Mannesmann Tubes, France
31. Welspun Corp Limited (Dahej), India

PIPE / TUBE CS (SEAMLESS) TO ASTM STDS

1. Arcelor Mittal Tubular Product Sromansa, Romania
2. Bhel (Trichy),India
3. Changshu Seamless Steel Tube Co. Ltd., China
4. Dalmine Spa (Enquiry To Tenaris, Uae)
5. Heavy Metals & Tubes Limited (Mehsana), India
6. Ismt Ltd. Ahmedngr, India
7. Ismt Ltd.Baramati India
8. Jfe Steel Corporation, Uae
9. Jindal Saw Ltd(Nashik Works) India
10. Klt Automotive And Tubular Products Ltd. India
11. Mahalaxmi Seamless Limited, India
12. Maharashtra Seamless Ltd, India
13. Products Tubular Ess. A. U, Spain
14. Ratnadeep Metal Tubes Ltd., India
15. Stainlees Tubes Pvt Ltd., India
16. Sumitomo Metal Ind. Ltd., India
17. Tubos Reunidos Sa Spain
18. Valcovny Trub Chomutov, Czech Republic
19. Vallourec And Mannesmann Tubes France
20. Yangzhou Chengde Steel Pipe Co. Ltd Du-Bai(Uae)

PIPE CARBON STEEL (WELDED) TO ASTM STDS

1. Eew Korea Co. Ltd. (Germany), Korea
2. Eew Korea Co. Ltd.(Korea) , Korea
3. Eisenbau Kramer Gmbh, Germany
4. Hyundai Rbco.Ltd., South Korea
5. Inox Tech. Spa, Italy
6. Jindal Saw Ltd(Kosi Works), India
7. Lalit Pipes And Pipes Ltd., India
8. Man Industeries (I)L Td.(Pithampur), India
9. Man Industries(India) Ltd. Anjar, India
10. Mukat Tanks & Vessels Ltd., India
11. Ratnamani Metals And Tubes Ltd., India
12. Sumitomo Metal India Ltd., India

GAIL_Internal

13. Tata Steel Uk Limited

Valve
Globe Valves

1) M/S Weir BDK Valves (A Unit Of Weir India Pvt.Ltd.)
2) M/S Datre Corpn (Calcutta)
3) M/S KSB Pumps Ltd., Coimbatore, India
4) M/S L&T Audco
5) M/S Neco Schuber &Salzer Ltd. (New Delhi)
6) M/S Niton Valve India Pvt. Ltd.,I Ndia
7) M/S Ornate Valves (Mumbai)
8) M/S Panchavati Valves &Flages (P)Ltd.,I Ndia
9) AV Valves Ltd., India
10) BHEL (Trichy), India
11) Econo Valves Pvt Ltd, India
12) Fouress Engg (I) Ltd (Aurangabad), India
13) Leader Valves Ltd, India
14) Oswal Industries Ltd,India
15) Petrochemical Engineering Enterprises, India (Fouress Group)
16) Sakhi Engineers Pvt Ltd.,India
17) Shalimar Valves Pvt Ltd.,India
18) Steel Strong Valves India Pvt Ltd, India
19) Petro Valves Pvt. Limited, Ahmedabad
20) Fluid Line Valves Co.(P)Ltd., India
21) MICON Engineers (Hubli)(P) Ltd., India

Check Valves

1. M/s Advance Valves Pvt. Ltd., Noida
2. M/s Aksons &Mechanical Enterprises, Mumbai
3. M/s Larsen &Toubro Limited (M/s Audco India Limited, Chennai)
4. M/s AV Valves Ltd.,India
5. M/s Weir BDK Valves (A unit of Weir India Pvt. Ltd.)
6. M/s BHEL,Trichy
7. M/s Datre Coroportion Limited, Calcutta
8. M/s Leader Valves Ltd., Jalandhar
9. M/s Neco Schubert &Salzer Ltd., New Delhi
10. M/s Niton Valves Industries (P) Ltd., Mumbai
11. M/s Precision Engg. Co., Mumbai
12. Econo Valves Pvt Ltd, India
13. Fouress Engg (I) Ltd (Aurangabad)
14. KSB PumpsLtd (Coimbattore), India
15. NSSL Ltd. (Neco Schubert & SalzerLtd)
16. Oswal Industries Ltd,India

17. Panchvati Valves& Flanges Pvt Ltd, India
18. Petrochemical Engineering Enterprises, India (Fouress Group)
19. Sakhi Engineers Pvt Ltd
20. Shalimar Valves PvtLtd
21. Steel Strong Valves India Pvt Ltd, India
22. Fluid Line Valves Co.(P)Ltd., India
23. MICON Engineers (Hubli) (P) Ltd., India

Plug Valves

1. M/s Breda Energia Sesto Industria Spa, Italy
2. M/s Fisher Sanmar Ltd.,Chennai
3. M/s Larsen &Toubro Ltd., (Audco) New Delhi
4. M/s Nordstrom Valves, USA
5. M/s Serck Audco Valves,UK
6. M/s Sumitomo Corporation India Pvt.Ltd., New Delhi
7. M/s Z Corporation, Korea
8. M/s Hawa Valves(India)Pvt.Ltd., Mumbai
9. M/s Steel Strong Valves India Pvt.Ltd., Navi Mumbai
10. M/s Econo Valves Pvt. Ltd., India (WSSL Ltd. Group Co.)
11. M/s Flow-Serve PTE (Mfr. SERCK),India
12. M/s.ZED valves Company Private Limited, Ahmedabad

Ball Valves

1. M/s Hawa Valves(India)Pvt. Ltd, Navi Mumbai
2. M/s Larsen &Toubro (Audco), India
3. M/s Oswal Industries Ltd., India
4. M/s Virgo Engineers Ltd., Delhi
5. M/s Boteli Valve Group Co. Ltd., China
6. M/s Cameron Italys.r.l.,Italy
7. M/s Dafram S.P.A., Italy
8. M/s Fangyuan Valve Group Co. Ltd., China
9. M/s Franz Schuck GmbH, Germany
10. Kita Mura Valve Manufacturing Co.Ltd., India
11. Petrol Valve S.R.Italy
12. Piplviesse S.P.A.Italy
13. Tormene Gas Technology S.P.A. Valvetalia Group, Italy
14. Valbart S.R.L.Italy
15. KMC Corporation, SouthKorea
16. MSA a.s. CzeekRepublic
17. OMS Aleri, Italy
18. PCC Valvess.r.l.Italy
19. Perar s.p.a.(Engineering. ToTRPsrl),Italy
20. Italys.r.l., Italy
21. MIR Valves,Malaysia

GAIL_Internal

22. M/s.ZED valves Company Private Limited, Ahmedabad

Flow Tee

1) M/s Coprosider SPA, Italy
2) M/s GEA Energy System India Limited,Chennai
3) M/s Multitex Filteration
4) M/s Pipeline Engineering,UK
5) M/s Scomark Engg. Limited (U.K.)
6) M/s Skeltonhall Limited,Engaland(U.K.)
7) M/s Technospecial SPA, Italy
8) M/s Tectubi SPA,Italy
9) M/s RMA Germany

Split Tee

1) M/s Ipsco, Canada
2) M/s TD Willamsons,USA

Flanges

1. M/s Aditya ForgeLtd.,Vadodara
2. M/s Amforge Industries Ltd.,Mumbai
3. M/s CD Engineering Co.,Ghaziabad
4. M/s Echjay Forgings Pvt.Ltd. (Bombay),Mumbai
5. M/s Echjay Industries Ltd., Rajkot
6. M/s Forge & ForgePvt. Ltd.,Rajkot
7. M/s Golden Iron &Steel Works,New Delhi
8. M/s JK Forgings,New Delhi
9. M/s Metal Forgings Pvt .Ltd., Mumbai
10. M/s Perfect Marketings Pvt.Ltd., New Delhi
11. M/s SkyForge, Faridabad
12. M/s S&G, Faridabad
13. Chaudhry Hammer Works Ltd, India
14. JAV Forgings (P)Ltd, India
15. Kunj Forgings PvtLtd, India
16. MS Fittings Mgf. Co.Pvt.Ltd.
17. R.N. Gupta & Co.Ltd, India
18. R.P.Engineering Pvt Ltd,India
19. Sanghvi Forgings &Engineering Ltd
20. Shri Ganesh ForgingsLtd., India
21. Uma Shankar Khandelwal &Co., India
22. Sawan Engineers, Baroda
23. Stewarts &Lloyds of India Ltd., Kolkata

GAIL_Internal

24. Engineering Services Enterprises
25. Abasi Engineersing Works, India
26. Anandmayee ForgingsPvtLtd, India
27. CD Industries., India
28. Fivebros Forgings VotLtd., India
29. Good Luck EngineeringCo., India
30. Korea Flange, SouthKorea
31. Lal MetalForgeLtd, India
32. Melesi Officine
33. Amlrojie Melesi &C. srl.Italy
34. Nicola Galperti & Figlio S.P.AIndia
35. Paramount Forge, India
36. Pradeep Metal Limited, India
37. Punjab Steel Works(the), India
38. R.D.Forge, India
39. Shah Industrial &Comml. Corporation, India
40. Ulma Forja S. Coop.
41. Vivial Forge Pvt.Ltd.,Vadodara
42. N J Engineers

Fittings

1. M/s Commercial Supplying Agency,Mumbai
2. M/s Dee Development Engineers Ltd.
3. M/s EbyIndustries, Mumbai
4. M/s Flash Forge Pvt.Ltd., Vishakhapatnam
5. M/s Gujarat Infra Pipes Pvt.Ltd., Vadodara
6. M/s M.S. Fittings Mfg.Co. Pvt.Ltd., Kolkata
7. M/s Stewarts& Lloyds of India Ltd.,Kolkata
8. M/s Teekay Tubes Pvt. Ltd.,Mumbai
9. M/s PipeFit,Baroda
10. M/s Sky Forge,Faridabad
11. M/s S&G,Faridabad
12. M/s Sawan Engineers, Baroda
13. Eby Fasteners, India
14. R.N. Gupta & Co.Ltd, India
15. Exten Engg PvtLtd
16. Sivananda Pipe& Fittings Ltd
17. Chero PipingSPA,Italy
18. CSA Fittings, India
19. EBY Fasteners, India
20. FittnoxSRL, Italy
21. Keonsae High PressureCo. Ltd.,SouthKorea
22. Munro &Miller FittingsLtd., U.K.
23. TK Corporation,SouthKorea

24. TubeTurn (India)PvtLtd., India
25. Topaz Piping Industries,India
26. Technoforge SPA, Italy
27. P.K.Tubes& FittingsPvt. Ltd., India
28. Vivial Forge Pvt. Ltd.,Vadodara
29. N J Engineers

Gaskets

1. IGP Engineers (P)Ltd.,Madras
2. Madras Industrial Products, Madras
3. Dikson & Company,Bombay
4. Banco Products (P) Ltd.,Vadodara
5. Goodrich Gaskets Pvt Ltd
6. Starflex Sealing India Pvt Ltd, India
7. Teekay Meta Flex Pvt Ltd
8. UNIKLINGER Ltd
9. HEM Engg. Corp.
10. Unique Industrial Packing Pvt.Ltd.

Fasteners

1. Nireka Engg.Co.(P)Ltd., Calcutta
2. PrecisionTaps&Dies,Bombay
3. AEP Company,Vithal Udyoug Nagar
4. FixFitFasteners, Calcutta
5. Precision Engg. Industries, Baroda
6. Echjay Forgings Pvt. Ltd., Bombay
7. Capital Industries,Bombay
8. Boltmaster India PvtLtd,India
9. Deepak Fasteners Limited, India
10. Fasteners &Allied Products PvtLtd,India
11. Hardwin Fasteners PvtLtd, India
12. J.J. Industries, India
13. Multi Fasteners Pvt Ltd, India
14. Nexo Industries,India
15. Pacific Forging & Fasteners PvtLtd,India
16. Pioneer Nuts & Bolts Pvt Ltd,India
17. Precision AutoEngineers, India
18. President Engineering Works, India
19. Sandeep Engineering Works, India
20. Syndicate Engineering Industries, India
21. BEA SRL, Italy
22. Korea Parts & Fasteners(KPF), South Korea
23. Kundan Industries Ltd.,India
24. Mega Engineering Pvt.Ltd., India

GAIL_Internal

25. OME Metallurgica ERBESES.R.L, Italy
26. Pankaj International, India
27. Udehra Fasters Ltd.,India

Welding Electrodes

1. For Mainline –Lincoln /Bohler make
2. For Terminal –For rootpass-Lincoln / Bohler Make

For other passes –Lincoln, D&H or equivalent make

NDT AGENCY

1. NDT Services, Ahmedabad
2. GEECY Industrial Services Pvt.Ltd., Mumbai
3. Corrosion Control Services, Mumbai
4. Perfect Metal Testing &Inspection Agency, Calcutta
5. Inter Ocean Shipping Co., New Delhi
6. RTD, Mumbai
7. Sievert, Mumbai
8. X-Tech, Vizag
9. Industrial X Ray and Allied Radiographers (I) Pvt. Ltd.
10. Inspection Technology, Mumbai

Fire Extinguishers

1. Avon Services (Production&Agencies) Pvt.Ltd.,Bombay
2. Kooverji Devshi&Co., Bombay
3. Zenith Fire Services, Bombay
4. Safex Fire Services, Bombay
5. Reliable (FireProtection) India Ltd.,Bombay
6. Brij Basi Hi
7. tech Udyog
8. Bharat Engg Works, India
9. Gunnebo India Ltd
10. Nitin Fire Protection Industries Ltd, India
11. Supremex Equipments, India
12. Vimal Fire Controls PvtLtd., India

Fire Hydrants, Monitors, Deluge Valve, Nozzles

1. Zenith
2. Minimax
3. Newage
4. HDFire
5. VijayFire
6. Asco Strumech PvtLtd, India
7. Brij Basi Hi
8. tech Udyog

GAIL_Internal

9. Gunnebo India Ltd
10. Nitin FireProtectionPvtLtd
11. Shah Bhogilal Jethamal&Brothers
12. Venus Pumps&Engineering Works

c) RRL Hose

1. Jayshree
2. Newage

d) Hoses

1. Ashit Sales Corporation,Bombay
2. Royal India Corporation,Bombay
3. Gayatri Industrial Corporation
4. Simplex Rubber Products Ltd., Ahmedabad
5. Zaverchand Marketing Pvt. Ltd.,Baroda
6. Presidency Rubber Mill,Calcutta
7. The Cosmopolite, Calcutta
8. SimplexRubber Products, Thane

e) Hose Delivery

1. Chhatarya Rubber &Chemical Industries,
2. Nitin Fire Protection Industries Ltd, India

f) Fire Hose Accessories

1. Asco StrumechPvtLtd
2. Brij Basi Hi-tech Udyog
3. Gunnebo India Ltd
4. Shah Bhogilal Jethamal & Brothers
5. Vimal Fire Controls PvtLtd., India

Heat Shrinkable Sleeves

1. Covalence Raychem (Berry Plastics Corporation)
2. Canussa – CPS
3. Shri Narayan Impac India LLP

Cold Applied Tapes

1. Denso GmBH
2. Polyken (BerryPlastics Corporation)

PUR Coating

1. Powercrete (BerryPlastics Corporation)

Casing End Closure

1. Raci, Italy
2. Raychem RPG Limited

GAIL_Internal

Warning mat

1. Sparco Multiplast Pvt. Ltd., Ahmedabad
2. M/s Raychem RPG Limited
3. Singhal Industries Private Limited

Rock shield

1. Raychem RPG Limited

High Build Epoxy Coating

1. Berry Plastics –Powercrete
2. Specialty Polymer Canada
3. Denso Protal,Canada

Casing Insulators

1. Raci, Italy
2. Raychem RPG Limited
3. Veekay Vikram

LONG RADIUS BENDS

i) M/s BHEL,Trichy,Tamilnadu
ii) M/s Jindal SAWLimited,(Koshi Works), U.P.
iii) M/s PSL Limited, Gandhidham, Gujarat
iv) M/s Welspun,Gujarat
v) M/s Fabricon,Belgium

INSULATING JOINTS (IJ)

i) M/s IGP Engineers,chennai
ii) M/s Basco (UK)
iii) M/s Bramsthal Postfach,Germany
iv) M/s Nuovagiungas ,Italy
v) M/s Phoceene DeMetallurgic,France
vi) M/s Piping Technology,France (ErstwhileM/sLall Storm)
vii) M/s Prochind SPA,Italy
viii) M/s Zunt Italiana
ix) M/s Meteor Pvt.Ltd.
x) M/s Alpha Engineering,italy
xi) M/s Igawara Industrial Services and TradingPvt.Ltd.
xii) M/s Sanghai Fiorentini Equipment
xiii) M/s RMA Maschinen
xiv) M/s Franz Schuk

GAIL_Internal

xv) M/s Advance Electronics Systems,Vadodara
xvi) M/s Veekay Vikram, Vadodara
xvii) M/s Langfang VBA Mechanical Co. Ltd., China

SOLENOID VALVES

i) M/s Asco Numatics(India) P. Limited
ii) M/s Precision Instrument Company
iii) M/s Avcon Controls Pvt. Ltd
iv) M/s Asco Joucomatic Ltd
v) M/s Schrader Duncan Limited
vi) M/s Herion Werke
vii) M/s Thompson valves Ltd
viii) M/s Rotex Automation Ltd
ix) M/s Asco Joucomatic SA
x) M/s Alcon Alexander Controls Limited

Gas Detector

i) M/s Endee Engineering Pvt Ltd
ii) M/s Respo Products
iii) M/s Emerson Process Management India Pvt Ltd.
iv) M/s Drager safety AG& CO.KGAA
v) M/s Uniphos Envirotronic Pvt Ltd.
vi) M/s Net Safety Monitoring Inc
vii) M/s Honeywell Analytics
viii) M/s Gastron Co Limited
ix) M/s Detector Electronics Corp (Kidde Co.)

Shut off- Valve

i) M/s Emerson Process Management India Pvt Ltd
ii) M/s Flowserve India Control Pvt Ltd.
iii) M/s Tyco Valves and Control
iv) M/s Advance Valve Private Limited
v) M/s Trillium Flow Technology India Pvt Ltd.
vi) M/s Samson Controls Pvt Ltd
vii) M/s El-O-Matic India Pvt Ltd.

TRANSITION FITTINGS

i. M/s George Fisher
ii. Kimplas Piping Systems ltd.
iii. M/s Jey Network

FLOW CONTROL VALVE

i. M/s Forbes Marshall (Pune)
ii. M/s ABB Ltd.(Nashik)
iii. M/s Fisher Xomox(NewDelhi)
iv. M/s Fouress Engg. (NewDelhi)
v. M/s Instrumentation Ltd.(Palghat)
vi. M/s MIL Controls Ltd. (Noida)
vii. M/s Samson Control (Thane)
viii. M/s Dresser

ULTRASONICFLOWMETER

i. M/s Emerson Process (represented by M/s Daniel Measurement & Control)
ii. M/s Instromet International, Belgium (represented by M/s Siddha Gas Instromet(I) Ltd.)
iii. M/s FMCMeasurementSolution, UK(representedbyM/sTrimax Engg., Mumbai)
iv. RMGMesstechnikGMBH
v. M/s SICK MAHAIK, (Represented byChemtrolsIndustries, Mumbai)

TURBINE METER

i. M/s Instromet(Belgium)
ii. M/s RMG (Germany)
iii. M/s Elster (Germany)
iv. M/s FluidComponents(USA)
v. M/s Barton Instruments(UK)
vi. M/s Bopp &Reuther (Germany)
vii. M/s Daniel Industries (USA)
viii. M/s Hoffer Flow(USA)
ix. M/s Rockwin Flow Meters

PANEL MOUNTED FLOW COMPUTERS

i. M/s Barton Instruments System Ltd. (UK)
ii. M/s Daniel Measurement and Controls (M/sEmerson Group)
iii. M/s Instromet International, Belgium (M/sEster-Instromet, India)
iv. M/s RMGMesstechnikGmbH (Germany)
v. M/s Omni Flow Computers Inc. (USA)/(RockwinFlow Meter India)

FIELD MOUNTED FLOWCOMPUTER

i. M/s Barton Instruments System LLC (UK)
ii. M/s Daniel Measurementand Controls (M/s Emerson Group)
iii. M/s Bristol Babcock(USA)

GAS CHROMATOGRAPH

GAIL_Internal

i. ABB Ltd, India
ii. Daniel Measurement&Control AsiaPacific, India
iii. InstrometInternationa,NV
iv. RMG Regal+MesstechnikGmbH

L.E.L DETECTION SYSTEM

1) Crowcon Detection Instruments Ltd
2) Detection Instruments (I) PvtLtd
3) Detector Electronics Corporation
4) MSA – Minessafetyappliances.
5) Oldham France S.A.
6) Drager SafetyAG&Co.KGAA
7) Honeywell

CONTROL AND SIGNAL CABLES

1. M/s ASSOCIATED CABLES
2. M/s DELTON Cables Ltd,India
3. M/s KEI Industries LtdINDIA
4. M/s – Cords Cable Industries Ltd, India
5. M/s Polycab Wires Pvt Ltd, India
6. M/s. T. C. Communication Pvt. Ltd., Delhi

ZENER BARRIERS/ISOLATORS

1) M/s MTL
2) M/s P& F

RTDs

1) M/s General Instruments Ltd.,Mumbai
2) M/s Nagman Sensors (Pvt.) Ltd.
3) M/s Pyro Electric, Goa

PRESSURE TRANSMITTERS, TEMP. TRANSMITTERS & DIFF. PRESSURE TRANSMITTER

1) M/s Fisher Rosemount(Emerson)
2) M/s Yokogawa
3) M/s Honeywell

PRESSURE GAUGES, D. P. GAUGES & TEMPERATURES GAUGES

1) M/s AN InstrumentsPvt.Ltd., New Delhi
2) M/s General Instruments Ltd.,Mumbai
3) M/s WIKA

GAIL_Internal

SS TUBE FITTINGS

1) M/s Swagelok(USA)
2) M/s Parker (USA)
3) M/s Dawsons Tech Components LLP

SS TUBE

1) M/s Sandvik, Sweden
2) M/s Ratnamani metals&tubes
3) M/s Heavy Metals& TubeLimited (Mehasana)
4) M/s Choksy Tube Co Ltd.

SS VALVES & MANIFOLDS

1) M/s Swagelok(USA)
2) M/s Parker (USA)
3) M/s Dawsons Tech Components LLP

JUNCTION BOXESAND CABLESGLANDS

1) M/s EX-PROTECTA
2) M/s FLAMEPROOFCONTROLGEARS
3) M/s BALIGA
4) M/s FLEXPRO ELECTRICALS

PUSHBUTTONS/LAMPS:

1) L&T
2) SIEMENS

MCB'S:

1) HAVELL'S
2) INDO ASIAN
3) MDS

RELAYS:

1) OEN
2) JYOTI

POWER SUPPLY UNIT:

1) ELNOVA
2) APLAB

GAIL_Internal

CONTROL ROOME QUIPMENT CONTROL PANEL & ACCESSORIES

1) M/s Keltron Controls Ltd., Kerala
2) M/s RITTAL
3) M/s Pyrotech
4) M/s Positronics Pvt. Ltd.

INDICATORS/CONTROLLERS/RECORDERS

1) M/s ABB
2) M/s EUROTHERN
3) M/s TATA HONEYWELL
4) M/s MASIBUS

TPI AGENCY

Only enlisted, approved, and valid TPI agencies as per PNGRB T4S guidelines for CGD shall be considered.

ADDITIONAL BOUGHT OUT MATERIAL VENDOR LIST

M/s. Chandan Enterprise for:

1.Brass Fittings (For size-3/4" and below)
2.Copper Pipe/Tube (For size-12 mm and below)
3.Anaconda
4.Isolation Valve (For size-1/2" and below)
5.Appliance Valve (For size-1/2" and below)
6.GI Fittings (For size-3/4" and below)
7.MLC Pipe And Fittings (upto Size ¾")

M/s. Jey Network for:

1.GI fittings -For size-1/2"
2.GI pipe Nipple/ Pipe Piece -For size upto 1"
3.Meter Adaptor G 1.6 -For size-1/2"
4.Isolation Ball Valve (Brass) -For size-1/2"
5.Appliance Valve -For size 1/2"
6.GI clamp- For size upto 1"
7.Meter Adaptor, MS-Blind – For size upto 3/4"
8. Transition Fittings – for Size -20mm
9. Anaconda Hose S.S
10. Warning Mat

M/s. Sumeru Infra Solution
1.Isolation Valve (For size-upto 1")
2.Appliance Valve (For size-upto 1/2")

M/s. Poline Technologies Private Limited
1.GI pipe Nipple (For size upto 1")

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2. Meter Adaptor G 1.6 (For size upto 1/2")
3. MS-Blind (For size upto 3/4")

Notes:

1) For procuring the above listed bought out item(s) from the vendor/ supplier, whose name is not appearing in the above preferred make list, bidders can supply those item(s) from such vendors/suppliers who have earlier supplied same item(s) for the intended services and the offered item(s) is in their regular manufacturing/ supply range and the same may be accepted subject to following:-

   a) The Vendor/ Supplier of bought out item(s) is a Manufacturer/ Supplier of the said item(s) for intended services and the same are in their regular manufacturing/ supply range.

   b) The vendor/supplier should not be in the Holiday list of Client/ BANDR/ Other PSU.

   c) For items to be procured with the unit of measurement in length, weight, or number (Nos.), the vendor/supplier shall have supplied, for the intended service, at least 15% of the SOR quantity of the same or higher size, class, thickness, schedule, pressure rating, temperature rating, SDR, or other applicable technical specifications, as specified in the SOR and Tender/Bid Specification. Such supplies shall have been made within the last seven (07) years preceding the date of the contractor's request for approval.

Remarks for Note 1:

i. To meet the criterion mentioned above, the successful bidder/ contractor is required to submit documentary evidences such as copy of FOA/ Purchase Order (PO)/ sub-purchase order and their supply record like Inspection certificates/report, Inspection release note, Tax paid invoice, performance certificates (if available), etc. from which it can be established that vendor have executed supplied the order. These documents shall require to be submitted by them within 15days from date of Placement of Order for approval to GAIL/ GAIL authorized site Consultant.

ii. The details of vendors indicated in this list are based on the information available with GAIL/ BANDR CGD projects under PSU's. The contractor shall verify the capabilities of each vendor to produce the required quantity and ensure that the items are within their regular manufacturing range. GAIL/ consultant does not take any guarantee or responsibility for the performance of the vendor. It is the contractor's responsibility to verify the correct status of the vendor and their quality control before proposing the vendor's name to the GAIL/ GAIL authorized site Consultant for approval. It is also the responsibility of the contractor to expedite the material in time.

iii. For those vendors whose names do not appear in the above-listed items but are registered with CGD projects under any PSU's, they can also be considered for the supply of the items. The contractor has to propose such vendors' names along with their valid registration letter issued by authority, or the vendor has to submit the PTR with all documents showing they have supplied materials for CGD in gas service for any PSU/government sector within the last 7 years.

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SECTION-V

SCHEDULE OF RATE (SOR)

1. **Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Individual Geographical Areas (GAs): Varanasi, Patna, Ranchi, Jamshedpur, Bhubaneswar, and Cuttack.**

2. **Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Individual Geographical Areas (GAs): Varanasi, Patna, Ranchi, Jamshedpur, Bhubaneswar, and Cuttack.**

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1. Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh

Sl. No	Description	Annexure Detail
1	SOR for Varanasi	Annexure-i
2	SOR for Patna	Annexure-ii
3	SOR for Ranchi	Annexure-iii
4	SOR for Jamshedpur	Annexure-iv
5	SOR for Bhubaneswar	Annexure-v
6	SOR for Cuttack	Annexure-vi

2. Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh

Sl. No	Description	Annexure Detail
1	SOR for Varanasi	Annexure-A
2	SOR for Patna	Annexure-B
3	SOR for Ranchi	Annexure-C
4	SOR for Jamshedpur	Annexure-D
5	SOR for Bhubaneswar	Annexure-E
6	SOR for Cuttack	Annexure-F

Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Varanasi GA (Annexure-i)

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SCHEDULE OF RATES (Annexure-i)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	Meter	100.00	300.00	30000.00
28	32 mm PE 100 pipe	Meter	200.00	300.00	60000.00
29	63 mm PE 100 pipe	Meter	50.00	352.50	17625.00
30	90 mm PE 100 pipe	Meter	30.00	442.50	13275.00
31	125 mm PE 100 pipe	Meter	18.23	532.50	9708.65
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	Meter	200.00	455.40	91080.00
34	32 mm PE 100 pipe	Meter	1200.00	455.40	546480.00
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	Meter	1200.00	649.50	779400.00
37	63 mm PE 100 pipe	Meter	1100.00	691.50	760650.00

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SCHEDULE OF RATES (Annexure-i)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
38	90 mm PE 100 pipe	Meter	800.00	1030.50	824400.00
39	125 mm PE 100 pipe	Meter	500.00	1389.00	694500.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	Meter	1.00	450.00	450.00
42	32 mm PE 100 pipe	Meter	2.00	450.00	900.00
43	63 mm PE 100 pipe	Meter	2.00	747.00	1494.00
44	90 mm PE 100 pipe	Meter	2.00	1258.50	2517.00
45	125 mm PE 100 pipe	Meter	2.00	2109.00	4218.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				
47	20 mm PE 100 pipe	Meter	1.00	546.00	546.00
48	32 mm PE 100 pipe	Meter	1.00	546.00	546.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	Meter	1.00	898.50	898.50
51	63 mm PE 100 pipe	Meter	1.00	1956.00	1956.00
52	90 mm PE 100 pipe	Meter	2.00	2973.00	5946.00
53	125 mm PE 100 pipe	Meter	2.00	4113.00	8226.00
54	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Hard rock)**				
55	20 mm PE 100 pipe	Meter	1.00	390.00	390.00
56	32 mm PE 100 pipe	Meter	1.00	390.00	390.00
57	63 mm PE 100 pipe	Meter	1.00	458.25	458.25
58	90 mm PE 100 pipe	Meter	1.00	575.25	575.25
59	125 mm PE 100 pipe	Meter	1.00	692.25	692.25
60	**Pipeline Laying Through Moling(without casing) in unprepared surface (Hard rock)**				
61	20 mm PE 100 pipe	Meter	1.00	592.02	592.02
62	32 mm PE 100 pipe	Meter	1.00	592.02	592.02
63	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
64	32 mm PE 100 pipe	Meter	1.00	844.35	844.35
65	63 mm PE 100 pipe	Meter	2.00	898.95	1797.90
66	90 mm PE 100 pipe	Meter	2.00	1339.65	2679.30
67	125 mm PE 100 pipe	Meter	2.00	1805.70	3611.40
68	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Hard rock)**				
69	20 mm PE 100 pipe	Meter	2.00	585.00	1170.00
70	32 mm PE 100 pipe	Meter	2.00	585.00	1170.00
71	63 mm PE 100 pipe	Meter	2.00	971.10	1942.20
72	90 mm PE 100 pipe	Meter	2.00	1636.05	3272.10
73	125 mm PE 100 pipe	Meter	2.00	2741.70	5483.40
74	**Pipeline Laying Through Moling(with casing) in unprepared surface (Hard rock)**				
75	20 mm PE 100 pipe	Meter	2.00	709.80	1419.60
76	32 mm PE 100 pipe	Meter	2.00	709.80	1419.60
77	**Pipeline Laying Through HDD (with casing) in unprepared surface (Hard rock)**				
78	32 mm PE 100 pipe	Meter	2.00	1168.05	2336.10
79	63 mm PE 100 pipe	Meter	2.00	2542.80	5085.60
80	90 mm PE 100 pipe	Meter	2.00	3864.90	7729.80
81	125 mm PE 100 pipe	Meter	2.00	5346.90	10693.80
82	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
83	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	NOS	40.00	3115.00	124600.00
84	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	NOS	10.00	4615.00	46150.00
85	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid. V) In case quantity increases beyond 4 meter payment towards additional length beyond 4 Mtr shall be paid as per releavant SOR item.				
86	**Restoration**				
87	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
89	Cement Concrete	Meter	100.00	1196.00	119600.00
90	Tiles / Paver / Blocks / Curb Stones, Red sand stone	Meter	400.00	227.70	91080.00
91	Brick Soling / Channels, etc.	Meter	2.00	248.00	496.00
92	RCC	Meter	20.00	1400.00	28000.00
93	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
94	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
95	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines. No additional payment shall be admissible against the same.**				
96	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
97	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
98	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
99	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				

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SCHEDULE OF RATES (Annexure-i)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
100	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
101	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
102	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
103	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
104	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
105	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
106	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
107	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
108	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
109	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
110	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
111	20 mm PE 100 pipe/32 mm PE 100 pipe	Meter	10.00	772.80	7728.00
112	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer- in-charge)**				
113	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
114	**GI Sleeves /Concrete Sleeves**				
115	2 $^{1}/_{2}$" NB, 1' Length	NOS	3.00	280.00	840.00
116	4" NB, 1' Length	NOS	2.00	501.00	1002.00
117	**Concrete Sleeve (NP-2 Class)**				
118	4" NB, 3' Length	NOS	2.00	278.00	556.00
119	6" NB, 3' Length	NOS	2.00	447.00	894.00
120	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In- Charge / Owner				
121	**Installation of valve(Normal stem) in pit including supply of valves**				
122	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
123	PE Valve 32 mm dia	NOS	2.00	4450.00	8900.00
124	PE Valve 63 mm dia	NOS	1.00	10291.00	10291.00
125	PE Valve 90 mm dia	NOS	1.00	15319.00	15319.00
126	PE Valve 125mm dia	NOS	1.00	21968.00	21968.00
133	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
135	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	2.00	47250.50	94501.00
136	Tvpe I : Inside size minimum 1500 mm x 1000 mm	NOS	1.00	74813.20	74813.20
137	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
138	**Fabrication & Installation of Markers**				
139	**RCC Route Markers**				
140	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	100.00	473.00	47300.00
141	**Pole Markers with Foundation**				
142	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	18.00	2631.20	47361.60
143	**Warning Plate Markers**				
144	Supply, fabrication and installation of plate markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawing in technical volume to be installed near regulator.	NOS	2.00	489.50	979.00
145	**Paver Block-Tiles Markers**				
146	Supply, fabrication and installation of Pvaer Block-Tiles markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawings to be installed on Paver Block/Tiles on foot Path/As per the instruction of EIC.	NOS	1.00	457.60	457.60
147	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
148	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	CUM	1.00	11740.00	11740.00
149	**GPR Survey (Scope includes submission of GPR survey report before/after obtaining permission for excavation from land owning agencies with complete satisfaction of the land owning agnency & Owner)**				
150	GPR Survey - Length up to 100 meter	NOS	2.00	8260.00	16520.00
151	GPR Survey - Length more than 100 meter	RM	10.00	81.00	810.00
152	Note: In case the Ground Penetrating Radar (GPR) survey length exceeds 100 m at any location, payment for the survey length beyond the initial 100 m shall be made in addition to the applicable SOR item, at the per running metre rate derived from the corresponding SOR item.				
153	**Excavation of Hard rock/surface**				

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SCHEDULE OF RATES (Annexure-i)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
154	Excavation of trench or pits, wherever hard rock presence is exceeding 1.5 m in any direction of the trench and excavation of trench or pits in Malba/Multiple layers of asphalt/ brick / PCC/RCC etc and removable only by pneumatic chisel / drill as per the specifications and direction of EIC. The rates are payable over and above the Laying rates as per relevant **SOR Item.**				
155	Cutting of PCC/RCC surface with thickness more than 12" or Continuous asphalt multi-layer/ Malba/ Brick / rock/ Boulders more than 24".(Malba shall be considered as a strata where soil is in mixed form of debris/building rubbish or discarded pieces of bricks/stones)	RM	2.00	126.00	252.00
156	**Additional Backfilling of Sand in excavated trench/Pit as per site requirement**				
157	Filling of M-Sand/Soft soil as per the site requirement and as per the instructions of EIC (except the sand padding as mentioned PE pipelime laying under SL No.2)	CUM	2.00	800.00	1600.00
158	**DRS/DCU/DRS cum DCU works**				
159	**Installation of DRS/DCU/DRS cum DCU**				
160	Receiving and taking over, handling, loading, transportation and unloading of DRS/DCU/DRS cum DCU from Owner's designated stockyards to site, installation at foundation (including supply of all structural items) and hooking up with PE pipe including all works as required to complete the job as per the drawings and specification, scope of work mentioned in tender doucment. The scope includes supply of transition fittings and other PE and CS fittings as per requirements and various associated works (including steel welding) to commission DRS/DCU/DRS cum DCU. Note: 1) Amount towards civil work shall be payable as per related SOR items. 2) Rate to include cost of all labour, tools, tackles, equipment, hire charges. 3) Bolts, nuts, washer, U-clamps, gaskets etc. if required during installation shall be procured and supplied by the Contractor within the rate quoted. These items shall not be separately measured and paid.				
161	DCU/DRS cum DCU. (Maximum weight of single DCU/DRS cum DCU shall be about 6.0 to 12 T)	NOS	1.00	54450.00	54450.00
162	**Note:** i) The quantities mentioned are indicative only. ii) For all the supply items mentioned above, procurement shall be made as per specification after due approval of engineer- in - charge.				
163	**CIVIL WORKS**				
164	**Earth Work** Earth in excavation and filling to the grades and levels shown in the approved drawings in all kinds of conditions including for Road embakments, using approved quality good earth from designated borrow area, for all heights and depths including clearing and stripping (min. 150 mm) of the area marked for filling, taking spot levels, consolidating the exposed natural soil surface, excavating the earth from borrow area loading, transporting & unloading, spreading in layers not exceeding 150 mm thickness, breaking clods, watering (if reqd.), ramming and compacting by manual/ mechanical means to give minimum 92% of modified Proctor's density of earth, testing & dressing including disposal of all unserviceable material all complete as per specifications and directions of Engineer-in-charge. (Rate to include cost of all labour, tools, tackles, equipment, hire chanrges, cost of borrow earth by way of royalties, right of way, cess etc., as applicable with all bye works and sundry works).	CUM	1.00	2312.20	2312.20
165	**PCC 1:2:4** 1 Cement : 2 Coarse sand : 4 stone aggregate 20mm nominal size.	CUM	1.00	3837.90	3837.90
166	**PCC 1:4:8** 1 Cement : 4 Coarse sand : 8 stone aggregate 40mm nominal size.	CUM	1.00	3092.10	3092.10
167	(Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials, shuttering, earthwork in excavation and backfilling using approved earth in all conditions etc. with all bye works and sundry works.)				
168	**Reinforced Cement Concrete**				
169	Providing and laying reinforced cement of grade M-25 with 20mm and down grade crushed stone aggregate in all types of structures like foundations, pedestals, pedestal bases, pipe supports, sleepers, column, equipment foundation, cable trench inlcuding construction joints, bitumen painting on surface in contact with soil, supplying and fixing reinforcing steel, shuttering, inserts, finishes etc. at all depths and heights complete as per drawings, specifications and direction of the Engineer-in-charge.	CUM	1.00	10417.00	10417.00
170	Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all maerials such as minimum 43 grade cement including sulphate resistant cement for sub-structures, R/F steel, Inserts, bolts, conduits, bitumen, other minor constrcution materials, shuttering, stanging, earthwork in excavation and backfilling using serviceable earth in all conditions, shorting bailing and pumping out water, testing of concrete, curing etc. with all bye works and sundry works.				
171	**Brick Work**				
172	Providing brick work with brick class designation M-7.5 of IS:1077 in cm1:4 (1 cement : 4 sand) in steps, walls, retaining walls and load bearing structures drains, or any shape with all lead, depths & height including curring, scaffolding, etc., as per specifications and drawings with all bye-works and direction of the Enfineer-in-charge.	CUM	1.00	3954.50	3954.50
173	(Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials such as minimum 43 grade cement, bricks, finishes, bitumen, other minor constrcution materials, shuttering, staging, masonry work, plastering, painting etc. with all bye-works and sundry works).				
174	**Note:** The quantites of individual item can varied as per site requirement.The payment will be made as per actual certified measurement at site.				
175	**Laying of Brick layer/ Concrete**				
176	**Providing single layer of Brick / Concrete / or impact resistant tape to entire width of trench above Warning Mat placed in trench over the laid pipeline as per OISD 226, standard drawing, specification and instruction of Owner. (Rate to include cost of all labour, tools, tackles, equipment, hire charges & supply of all materials, etc)**				
177	Brick Layer for width of PE pipeline trench as per drawing (75 mm thk.)	SQM	3.00	177.10	531.30
178	Concrete for width of PE pipeline trench as per drawing (80 mm thk.)	SQM	4.00	268.40	1073.60
179	**Demolition of PCC work below plinth level**				
180	Demolishing plain cement concrete (PCC) work (taking all necessary safety precautions) for all depths below plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning, etc. , disposal of unserviceable material outside the boundary limits keeping the owner indemnified of any liabilities from statutory/ local bodies, all complete work as specified and directed	CUM	1.00	1521.30	1521.30
181	**Excavation for foundation works**				
182	Excavation as per plan, upto 3 meters and upto any lead in all conditions, backfilling using serviceable earth and disposal of surplus and unserviceable earth. Soil to be levelled and neatly dressed complete in all respect as per scope of work, technical specification and directions of EIC.				
183	Upto 3.0 Mtrs	CUM	1.00	1064.80	1064.80
184	Dismantling of RCC & cutting of reinforcement (Thickness above 3")	CUM	1.00	1850.20	1850.20
185	**Structural Works**				
186	**Providing and fixing Fencing Structure**				
187	Supplying, fabricating & fixing GI wire fencing fabricated from GI wire confirming to IS: and GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, including applying two coats of approved quality of synthetic enamel paint over a priming coat of in approved shade including supply of all raw materials, bolts, electrodes, transportation, including making pokets & pouring with PCC (1:2:4) in of block for fixing of posts etc including Y type angle and barbed wire (900 mm) complete as per enclosed drawing, technical specifications, scope of works and directions of the Engineer-In-Charge.				
188	Fencing height 2.1m alongwith barbed wire of height atleast 900 mm on Y type angle.	RM	1.00	2235.20	2235.20
189	**Providing and fixing Fencing Gates**				
190	Supplying, fabricating & fixing fencing gates fabricated from pipes conforming to IS:1161 and plates conforming to IS:2062 & fixing of GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, painting with enamel paint in approved shade including supply of all raw materials, bolts, electrodes, transportation etc complete as per enclosed sketch, technical specifications and directions of the Engineer-In- Charge.				
191	4m Wide x 2.1m High	NOS	1.00	45026.30	45026.30
192	3m Wide x 2.1m High	NOS	1.00	25727.90	25727.90

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SCHEDULE OF RATES (Annexure-i)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
193	1m Wide x 2.1m High	NOS	1.00	11580.80	11580.80
194	**Fencing for wall mounted skid for Industrial/Commercial** Supplying, transporting, fabricating, and fixing GI welded mesh fencing with a thickness of not less than 18 gauge (50x50 mm) and a GI structural steel frame of size 35mm x 35mm, assembled by welding or bolting. The fencing includes a double-door facility and the provision of all required raw materials, such as bolts, electrodes, hinges, locking arrangements, and anchoring with appropriately sized bolts as necessary. The work also includes applying two coats of enamel paint (Asian/Berger paint) and completing all tasks as per the scope of work and directions of the Engineer-In-Charge. Fabrication drawings, based on site conditions, must be approved by the Engineer-In-Charge before execution of the work.	KG	1.00	165.00	165.00
195	**Preservation of Pipeline**				
196	**Preservation of pipeline sections and associated facilities (in event of delay in comissioning, other unforeseen reasons) including supply of nitrogen, all consumables, all equipment, man-power, etc. complete as per the requirements of specifications, other provisions of Contract document and instructions of Engineer-in-charge.**				
197	**By filling and pressurizing with nitrogen to a pressure of 2 bar(g) for a period of one month or part thereof.**				
198	For 125 mm Pipeline	Meter	1.00	11.70	11.70
199	For 90 mm Pipeline	Meter	1.00	10.14	10.14
200	For 63 mm Pipeline	Meter	1.00	8.58	8.58
201	For 32 mm Pipeline	Meter	1.00	7.02	7.02
202	For 20 mm Pipeline	Meter	1.00	6.24	6.24
203	**For every additional period of one month or part thereof Limited to 6 month**				
204	For 125 mm Pipeline	Meter	1.00	6.24	6.24
205	For 90 mm Pipeline	Meter	1.00	5.46	5.46
206	For 63 mm Pipeline	Meter	1.00	4.68	4.68
207	For 32 mm Pipeline	Meter	1.00	3.60	3.60
208	For 20 mm Pipeline	Meter	1.00	3.12	3.12
209	**Notes:** i) The above length is not for a single section but for no. of sections. ii) All accessrious ie; End caps and two nos tappings of 3/4 inches, PG to be considered per section and rate for the same shall be quoted by bidder under this item. iii) If month is partially complete, payment shall be made on prorata basis. iv) Scope includes pressure holding for a period of 6 months or as per EIC and jointing of PE pipe (if required) due to damage by any means and further filling of nitrogen for pressure holding.				
210	**Liaisoning with Land Owning Agencies for Permission** Submission of applications as per approved drawing provided by owner / owner's representative (Initial Route survey, prepartion of drawing, measuring and providing details of surface type shall be in scope of contractor), obtaining and submission of demand note, coordination, Liaisoning, obtaining written permission from land owing agencies like NHAI, AAI,Indian Railways and any other government agencies who maintains the public lands and agencies owing Private lands etc. (all fee paid to authorities excluding demand charges or Bank Guarantees shall be reimbursed against documentary evidence). This rates are not applicable for Private lands i.e. Apartments etc. Permissions required from various authorities like NHAI / Railways / Irrigation (Canal) etc. falling enroute shall be inclusive in the item rate.	KM	1.00	14910.83	14910.83
211	**Installation of GI Service Pipe (For Commercial Connection and Installaton of Service Regulator)**				
212	Supply, loading, storing, unloading and laying of GI pipes, including supply of GI fittings/accessories of all sizes & thickness like Elbows, Tees, unions, sockets, reducers, GI plugs, sleeves etc., installation of GI line (alongwith installation of required accessories as mentioned above) of following sizes, including fabrication with supply of all materials, consumables, labour and other incidental works. Carrying out all temporary, ancillary, auxiliary works required to make the GI line ready for commissioning as per drawings specifications.				
213	Finalisation of optimum route with consent of customer, from transition fitting to cooking oven/ appliance.				
214	Making temporay but stable platforms/ scaffolding/ rope ladders and all other safety devices.				
215	Installation of GI Pipes, Fittings, Valves, warning plate including NPT threading, painting as specified (installation of meters & regulators forms a separate SOR item).				
216	Drillings of holes through walls (Brick, RCC), Granite, Marble, Glass Cutting with proper heavy duty hammer drill machine tools and tackeles, using proper sealent /grout materialed colors to match the original replacement of damages during drillling, restoring the area to original condition.				
217	Supply & Fixing of approved clamps, Dowell Plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape/ lock tight, drilling of holes through tiles/ wood/ marble/ Granite etc. jointing of PE to above Ground service GI pipes, testing, purging with Nitrogen and commissioning of the complete installation as per specification.				
218	Painting of entire length of pipe along with fittings after proper surface finish by one coat of approved primer paint and two coats of approved synthetic enamel paint complete as per specification & direction of EIC. Restoring the wall surface to origin				
219	All above activities to be carried out as per specification to the complete satisfaction of consumer & as desired by Engineer-in-charge.				
220	Handing over the completed works to Client for operation/ use, reconciliation of material area wise.				
221	Any other activity not mentioned/ covered, explicitly above, but otherwise required for satisfactory completion/ safety/ statutory/ maintenance of works shall also be covered under scope of work and has to be completed by contractor within specified schedule time.				
222	2" CS Pipe : commercial and service regulator connections (Supply in the scope of the contractor)	Meter	1.00	1501.50	1501.50
223	1" CS Pipe : commercial and service regulator connections (Supply in the scope of the contractor)	Meter	1.00	1210.00	1210.00
224	3/4"GI Pipe: commercial and service regulator connections (Supply in the scope of the contractor)	Meter	1.00	632.50	632.50
225	1/2" GI Pipe :commercial and service regulator connections (Supply in the scope of the contractor)	Meter	1.00	522.50	522.50
226	Installation of Commercial/Industrial Regulators and Meters of various sizes and capacities and Flexible Hoses including conversion of burners. The scope of work includes supply of all items required items (Only Meters and Regulators shall be provided as free issue) and all associated works. **(Diaphragm Meter)**	NOS	1.00	6600.00	6600.00
227	Installation of Commercial/Industrial Regulators and Meters of various sizes and capacities and Flexible Hoses including conversion of burners. The scope of work includes supply of all items required (Only Meters and Regulators shall be provided as free issue) and all associated works. **(RPD Meter)** Including supply, installation of #150 Flange of size 3"/2"/1.5"/1" (2 set with meter and 2 set with regulator), Stud-Nut, Gaskets, Elbow, L-Clamp, Grouting, Reducer, U-Clamp with rubber, and 01 Pressure Guage (0-4.2 Kg/Cm2) of reputed make and to the satisfaction of EIC. Works include installation of Free issued Strainer, NRV in all respects.	NOS	1.00	30800.00	30800.00
228	**Supply and installation of Valves including flanges, gasket, stud bolt etc as required.**				
229	**Supply and installation of Isolation Valves as per Technical Specification and as directed by EIC,(Approved make L&T/Audco or as mentioned in tender)**				
230	Isolation Ball Valve 3 " max. 6 bar (g)	NOS	1.00	24750.00	24750.00
231	Isolation Ball Valve 2 " max. 6 bar (g)	NOS	1.00	16500.00	16500.00
232	Isolation Ball Valve 1 " max. 6 bar (g)(Threaded)	NOS	1.00	2750.00	2750.00
233	Isolation Ball Valve 1 " max. 6 bar (g)(Flanged)	NOS	1.00	8250.00	8250.00
234	Isolation Ball Valve 3/4 " max. 6 bar (g)	NOS	1.00	466.40	466.40
235	Isolation Ball Valve 1/2" max. 6 bar (g)	NOS	1.00	295.90	295.90
236	**Installation of Service Regulator / Field Regulator: Installation & Fixing of regulator with associated inlet and outlet**				
237	**The scope also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).**				
238	Service Regulator installation - (4/6 bar to 100 mbar)	NOS	1.00	2750.00	2750.00
239	**Regulator Boxes: Supply including painting of approved make regulator boxes and installing them firmly by grouting using approved bracket /clamps as per drawing enclosed & as per specifications and and cleaning the area complete to the satisfaction.**				
240	Service Regulator Boxes: Supply and installation of Service Regulators Boxes as per drawing attached and as per directions of EIC.	NOS	1.00	3300.00	3300.00
241	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
242	4" TF	NOS	1.00	16516.50	16516.50

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SCHEDULE OF RATES (Annexure-i)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
243	2" TF	NOS	1.00	3740.00	3740.00
244	1" TF	NOS	1.00	1072.50	1072.50
245	**Crossing of Sewage Drains/Nala alongside independent houses where drains/Nalas are being encountered adjacent to houses.**				
246	The scope of work includes supply of medium-duty GI casing pipes of 2.5 inches, along with padding with sandstone and civil works associated with the construction of cover slab as per std. drawing.	NOS	1.00	3465.00	3465.00
247	**General Note:** (i) The quantites of individual item can varied as per site requirement.The payment will be made as per actual certified measurement at site. For the supply items the quantities shall be procured after approval from client/ consultant/EIC. (ii) The bidder must indicate currency(ies) against each quoted item of the SOR. (iii) The total amount shall also be given by the bidder in the quoted currency(ies). (iv) Some of the may / may not be execute as per site requirements.				
248	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
249	20 mm PE 100 MDPE Pipeline	Meter	5.00	212.00	1060.00
250	32 mm PE 100 MDPE Pipeline	Meter	5.00	248.00	1240.00
251	63 mm PE 100 MDPE Pipeline	Meter	5.00	325.00	1625.00
252	90 mm PE 100 MDPE Pipeline	Meter	5.00	343.00	1715.00
253	125 mm PE 100 MDPE Pipeline	Meter	5.00	500.00	2500.00
254	**TOTAL VALUE (EXCLUDING GST)**				**50,00,000.00**

GAIL_Internal

Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Patna GA (Annexure-ii)

GAIL_Internal

SCHEDULE OF RATES (Annexure-ii)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Patna GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	Meter	20.00	300.00	6000.00
28	32 mm PE 100 pipe	Meter	200.00	300.00	60000.00
29	63 mm PE 100 pipe	Meter	200.00	352.50	70500.00
30	90 mm PE 100 pipe	Meter	20.00	442.50	8850.00
31	125 mm PE 100 pipe	Meter	20.00	532.50	10650.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	Meter	200.00	455.40	91080.00
34	32 mm PE 100 pipe	Meter	2000.00	455.40	910800.00
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	Meter	2580.00	649.50	1675710.00
37	63 mm PE 100 pipe	Meter	1700.00	691.50	1175550.00
38	90 mm PE 100 pipe	Meter	100.00	1030.50	103050.00
39	125 mm PE 100 pipe	Meter	20.00	1389.00	27780.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	Meter	2.00	450.00	900.00
42	32 mm PE 100 pipe	Meter	50.00	450.00	22500.00

SCHEDULE OF RATES (Annexure-ii)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Patna GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
43	63 mm PE 100 pipe	Meter	50.00	747.00	37350.00
44	90 mm PE 100 pipe	Meter	2.00	1258.50	2517.00
45	125 mm PE 100 pipe	Meter	2.00	2109.00	4218.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				
47	20 mm PE 100 pipe	Meter	2.00	546.00	1092.00
48	32 mm PE 100 pipe	Meter	2.00	546.00	1092.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	Meter	2.00	898.50	1797.00
51	63 mm PE 100 pipe	Meter	2.00	1956.00	3912.00
52	90 mm PE 100 pipe	Meter	2.00	2973.00	5946.00
53	125 mm PE 100 pipe	Meter	2.00	4113.00	8226.00
54	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing , payment for length of PE pipe will be done as per casing pipe length.				
55	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	Nos	4.00	3115.00	12460.00
56	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	Nos	4.00	4615.00	18460.00
57	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid.				
58	**Restoration**				
59	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
60	Asphalting	Meter	10.00	600.00	6000.00
61	Cement Concrete	Meter	300.00	1196.00	358800.00
62	Tiles / Paver / Blocks / Curb Stones, Red sand stone	Meter	10.00	227.70	2277.00
63	Brick Soling / Channels, etc.	Meter	10.00	248.00	2480.00
64	RCC	Meter	10.00	1400.00	14000.00
65	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
66	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
67	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines**. **No additional payment shall be admissible against the same.**				
68	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
69	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
70	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
71	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
72	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
73	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
74	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
75	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
76	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
77	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
78	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
79	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
80	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
81	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
82	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
83	20 mm PE 100 pipe/32 mm PE 100 pipe	Meter	10.00	772.80	7728.00

GAIL_Internal

SCHEDULE OF RATES (Annexure-ii)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Patna GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
84	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer-in-charge)**				
85	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
86	**GI Sleeves /Concrete Sleeves**				
87	2 $^{1}/_{2}$" NB, 1' Length	Nos	2.00	280.00	560.00
88	4" NB, 1' Length	Nos	2.00	501.00	1002.00
89	**Concrete Sleeve (NP-2 Class)**				
90	4" NB, 3' Length	Nos	2.00	278.00	556.00
91	6" NB, 3' Length	Nos	2.00	447.00	894.00
92	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In-Charge / Owner				
93	**Installation of valve(Normal stem) in pit including supply of valves**				
94	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
95	PE Valve 32 mm dia	Nos	4.00	4450.00	17800.00
96	PE Valve 63 mm dia	Nos	2.00	10291.00	20582.00
97	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
98	Type-I having Internal size of Minimum 600 x 600mm	Nos	6.00	31000.00	186000.00
99	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
100	**Fabrication & Installation of Markers**				
101	**RCC Route Markers**				
102	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	Nos	80.00	473.00	37840.00
103	**Pole Markers with Foundation**				
104	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	Nos	8.00	2631.20	21049.60
105	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
106	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	Cum	2.00	11740.00	23480.00
107	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
108	1" TF	Nos	2.00	1072.50	2145.00
109	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
110	20 mm PE 100 MDPE Pipeline	Meter	20.00	212.00	4240.00
111	32 mm PE 100 MDPE Pipeline	Meter	25.00	248.00	6200.00
112	63 mm PE 100 MDPE Pipeline	Meter	25.00	325.00	8125.00
113	90 mm PE 100 MDPE Pipeline	Meter	51.90	343.00	17801.40
114	**TOTAL VALUE (EXCLUDING GST)**				**50,00,000.00**

GAIL_Internal

Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Ranchi GA (Annexure-iii)

GAIL_Internal

SCHEDULE OF RATES (Annexure-iii)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Ranchi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	Meter	20.00	300.00	6000.00
28	32 mm PE 100 pipe	Meter	200.00	300.00	60000.00
29	63 mm PE 100 pipe	Meter	200.00	352.50	70500.00
30	90 mm PE 100 pipe	Meter	20.00	442.50	8850.00
31	125 mm PE 100 pipe	Meter	20.00	532.50	10650.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	Meter	200.00	455.40	91080.00
34	32 mm PE 100 pipe	Meter	2040.09	455.40	929056.82
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	Meter	2700.00	649.50	1753650.00
37	63 mm PE 100 pipe	Meter	1200.00	691.50	829800.00
38	90 mm PE 100 pipe	Meter	150.00	1030.50	154575.00
39	125 mm PE 100 pipe	Meter	30.00	1389.00	41670.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	Meter	2.00	450.00	900.00
42	32 mm PE 100 pipe	Meter	50.00	450.00	22500.00

SCHEDULE OF RATES (Annexure-iii)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Ranchi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
43	63 mm PE 100 pipe	Meter	50.00	747.00	37350.00
44	90 mm PE 100 pipe	Meter	2.00	1258.50	2517.00
45	125 mm PE 100 pipe	Meter	2.00	2109.00	4218.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**		0.00		0.00
47	20 mm PE 100 pipe	Meter	2.00	546.00	1092.00
48	32 mm PE 100 pipe	Meter	2.00	546.00	1092.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	Meter	2.00	898.50	1797.00
51	63 mm PE 100 pipe	Meter	2.00	1956.00	3912.00
52	90 mm PE 100 pipe	Meter	2.00	2973.00	5946.00
53	125 mm PE 100 pipe	Meter	2.00	4113.00	8226.00
54	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Hard rock)**				
55	20 mm PE 100 pipe	Meter	2.00	390.00	780.00
56	32 mm PE 100 pipe	Meter	100.00	390.00	39000.00
57	63 mm PE 100 pipe	Meter	50.00	458.25	22912.50
58	90 mm PE 100 pipe	Meter	2.00	575.25	1150.50
59	125 mm PE 100 pipe	Meter	2.00	692.25	1384.50
60	**Pipeline Laying Through Moling(without casing) in unprepared surface (Hard rock)**				
61	20 mm PE 100 pipe	Meter	2.00	592.02	1184.04
62	32 mm PE 100 pipe	Meter	2.00	592.02	1184.04
63	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
64	32 mm PE 100 pipe	Meter	2.00	844.35	1688.70
65	63 mm PE 100 pipe	Meter	2.00	898.95	1797.90
66	90 mm PE 100 pipe	Meter	2.00	1339.65	2679.30
67	125 mm PE 100 pipe	Meter	2.00	1805.70	3611.40
68	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Hard rock)**				
69	20 mm PE 100 pipe	Meter	2.00	585.00	1170.00
70	32 mm PE 100 pipe	Meter	2.00	585.00	1170.00
71	63 mm PE 100 pipe	Meter	2.00	971.10	1942.20
72	90 mm PE 100 pipe	Meter	2.00	1636.05	3272.10
73	125 mm PE 100 pipe	Meter	2.00	2741.70	5483.40
74	**Pipeline Laying Through Moling(with casing) in unprepared surface (Hard rock)**				
75	20 mm PE 100 pipe	Meter	2.00	709.80	1419.60
76	32 mm PE 100 pipe	Meter	2.00	709.80	1419.60
77	**Pipeline Laying Through HDD (with casing) in unprepared surface (Hard rock)**				
78	32 mm PE 100 pipe	Meter	2.00	1168.05	2336.10
79	63 mm PE 100 pipe	Meter	2.00	2542.80	5085.60
80	90 mm PE 100 pipe	Meter	2.00	3864.90	7729.80
81	125 mm PE 100 pipe	Meter	2.00	5346.90	10693.80
82	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
83	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	NOS	4.00	3115.00	12460.00
84	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	NOS	4.00	4615.00	18460.00
85	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid.				
86	**Restoration**				
87	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
88	Asphalting	Meter	10.00	600.00	6000.00
89	Cement Concrete	Meter	300.00	1196.00	358800.00
90	Tiles / Paver / Blocks / Curb Stones, Red sand stone	Meter	10.00	227.70	2277.00
91	Brick Soling / Channels, etc.	Meter	10.00	248.00	2480.00
92	RCC	Meter	10.00	1400.00	14000.00
93	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
94	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
95	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines. No additional payment shall be admissible against the same.**				
96	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
97	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
98	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
99	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
100	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
101	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
102	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				

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SCHEDULE OF RATES (Annexure-iii)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Ranchi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
103	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
104	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
105	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
106	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
107	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
108	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
109	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
110	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
111	20 mm PE 100 pipe/32 mm PE 100 pipe	Meter	10.00	772.80	7728.00
112	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer-in-charge)**				
113	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
114	**GI Sleeves /Concrete Sleeves**				
115	2 $^{1}/_{2}$" NB, 1' Length	NOS	2.00	280.00	560.00
116	4" NB, 1' Length	NOS	2.00	501.00	1002.00
117	**Concrete Sleeve (NP-2 Class)**				
118	4" NB, 3' Length	NOS	2.00	278.00	556.00
119	6" NB, 3' Length	NOS	2.00	447.00	894.00
120	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In-Charge / Owner				
121	**Installation of valve(Normal stem) in pit including supply of valves**				
122	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
123	PE Valve 32 mm dia	NOS	4.00	4450.00	17800.00
124	PE Valve 63 mm dia	NOS	2.00	10291.00	20582.00
125	PE Valve 90 mm dia	NOS	1.00	15319.00	15319.00
126	PE Valve 125mm dia	NOS	1.00	21968.00	21968.00
127	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
128	Type-I having Internal size of Minimum 600 x 600mm	NOS	6.00	31000.00	186000.00
129	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	1.00	47250.50	47250.50
130	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
131	**Fabrication & Installation of Markers**				
132	**RCC Route Markers**				
133	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	80.00	473.00	37840.00
134	**Pole Markers with Foundation**				
135	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	8.00	2631.20	21049.60
136	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
137	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	CUM	2.00	11740.00	23480.00
138	**Excavation of Hard rock/surface**				
139	Excavation of trench or pits, wherever hard rock presence is exceeding 1.5 m in any direction of the trench and excavation of trench or pits in Malba/Multiple layers of asphalt/ brick / PCC/RCC etc and removable only by pneumatic chisel / drill as per the specifications and direction of EIC. The rates are payable over and above the Laying rates as per relevant SOR Item.				
140	Cutting of PCC/RCC surface with thickness more than 12" or Continuous asphalt multi-layer/ Malba/ Brick / rock/ Boulders more than 24".(Malba shall be considered as a strata where soil is in mixed form of debris/building rubbish or discarded pieces of bricks/stones)	RM	2.00	126.00	252.00
141	**Additional Backfilling of Sand in excavated trench/Pit as per site requirement**				
142	Filling of M-Sand/Soft soil as per the site requirement and as per the instructions of EIC (except the sand padding as mentioned PE pipelime laying under SL No.2)	CUM	2.00	800.00	1600.00
143	**CIVIL WORKS**				
144	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
145	2" TF	NOS	1.00	3740.00	3740.00
146	1" TF	NOS	2.00	1072.50	2145.00
147	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
148	20 mm PE 100 MDPE Pipeline	Meter	10.00	212.00	2120.00
149	32 mm PE 100 MDPE Pipeline	Meter	10.00	248.00	2480.00
150	63 mm PE 100 MDPE Pipeline	Meter	10.00	325.00	3250.00
151	90 mm PE 100 MDPE Pipeline	Meter	10.00	343.00	3430.00
152	**TOTAL VALUE (EXCLUDING GST)**				**50,00,000.00**

Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Jamshedpur GA (Annexure-iv)

GAIL_Internal

SCHEDULE OF RATES (Annexure-iv)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Jamshedpur GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	MTR	200.00	300.00	60000.00
28	32 mm PE 100 pipe	MTR	1000.00	300.00	300000.00
29	63 mm PE 100 pipe	MTR	200.00	352.50	70500.00
30	90 mm PE 100 pipe	MTR	200.00	442.50	88500.00
31	125 mm PE 100 pipe	MTR	200.00	532.50	106500.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	32 mm PE 100 pipe	MTR	100.00	455.40	45540.00
34	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
35	63 mm PE 100 pipe	MTR	200.00	691.50	138300.00
36	90 mm PE 100 pipe	MTR	602.06	1030.50	620420.60
37	125 mm PE 100 pipe	MTR	1700.00	1389.00	2361300.00
38	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
39	90 mm PE 100 pipe	MTR	160.00	1339.65	214344.00
40	125 mm PE 100 pipe	MTR	160.00	1805.70	288912.00
41	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
42	**Restoration**				
43	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
44	Cement Concrete	MTR	160.00	1196.00	191360.00
45	**Installation of valve(Long stem) in pit including supply of valves**				
46	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
47	PE Valve(Long Stem) 90 mm dia	NOS	2.00	15319.00	30638.00
48	PE Valve(Long stem) 125mm dia	NOS	2.00	21968.00	43936.00

GAIL_Internal

SCHEDULE OF RATES (Annexure-iv)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Jamshedpur GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
49	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
50	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	2.00	47250.50	94501.00
51	Tvpe I : Inside size minimum 1500 mm x 1000 mm	NOS	2.00	74813.20	149626.40
52	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
53	**Fabrication & Installation of Markers**				
54	**RCC Route Markers**				
55	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	50.00	473.00	23650.00
56	**Pole Markers with Foundation**				
57	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	10.00	2631.20	26312.00
58	**GPR Survey (Scope includes submission of GPR survey report before/after obtaining permission for excavation from land owning agencies with complete satisfaction of the land owning agnency & Owner)**				
59	GPR Survey	RM	1000.00	81.00	81000.00
60	**Installation of Service Regulator / Field Regulator: Installation & Fixing of regulator with associated inlet and outlet**				
61	**The scope also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).**				
62	Service Regulator installation - (4/6 bar to 100 mbar)	NOS	2.00	2750.00	5500.00
63	**Regulator Boxes: Supply including painting of approved make regulator boxes and installing them firmly by grouting using approved bracket /clamps as per drawing enclosed & as per specifications and and cleaning the area complete to the satisfaction.**				
64	Service Regulator Boxes: Supply and installation of Service Regulators Boxes as per drawing attached and as per directions of EIC.	NOS	2.00	3300.00	6600.00
65	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
66	63 mm PE 100 MDPE Pipeline	Meter	45.00	325.00	14625.00
67	90 mm PE 100 MDPE Pipeline	Meter	45.00	343.00	15435.00
68	125 mm PE 100 MDPE Pipeline	Meter	45.00	500.00	22500.00
69	**TOTAL VALUE (EXCLUDING GST)**				**50,00,000.00**

Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Bhubaneswar GA (Annexure-v)

GAIL_Internal

SCHEDULE OF RATES (Annexure-v)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	MTR	1000.00	300.00	300000.00
28	32 mm PE 100 pipe	MTR	500.00	300.00	150000.00
29	63 mm PE 100 pipe	MTR	50.00	352.50	17625.00
30	90 mm PE 100 pipe	MTR	10.00	442.50	4425.00
31	125 mm PE 100 pipe	MTR	10.00	532.50	5325.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	MTR	20.00	455.40	9108.00
34	32 mm PE 100 pipe	MTR	20.00	455.40	9108.00
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	MTR	3000.00	649.50	1948500.00

GAIL_Internal

SCHEDULE OF RATES (Annexure-v)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
37	63 mm PE 100 pipe	MTR	300.00	691.50	207450.00
38	90 mm PE 100 pipe	MTR	100.00	1030.50	103050.00
39	125 mm PE 100 pipe	MTR	100.00	1389.00	138900.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	MTR	5.00	450.00	2250.00
42	32 mm PE 100 pipe	MTR	5.00	450.00	2250.00
43	63 mm PE 100 pipe	MTR	5.00	747.00	3735.00
44	90 mm PE 100 pipe	MTR	5.00	1258.50	6292.50
45	125 mm PE 100 pipe	MTR	5.00	2109.00	10545.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				
47	20 mm PE 100 pipe	MTR	5.00	546.00	2730.00
48	32 mm PE 100 pipe	MTR	5.00	546.00	2730.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	MTR	5.00	898.50	4492.50
51	63 mm PE 100 pipe	MTR	5.00	1956.00	9780.00
52	90 mm PE 100 pipe	MTR	5.00	2973.00	14865.00
53	125 mm PE 100 pipe	MTR	5.00	4113.00	20565.00
54	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Hard rock)**				
55	20 mm PE 100 pipe	MTR	250.00	390.00	97500.00
56	32 mm PE 100 pipe	MTR	50.00	390.00	19500.00
57	63 mm PE 100 pipe	MTR	10.00	458.25	4582.50
58	90 mm PE 100 pipe	MTR	10.00	575.25	5752.50
59	125 mm PE 100 pipe	MTR	10.00	692.25	6922.50
60	**Pipeline Laying Through Moling(without casing) in unprepared surface (Hard rock)**				
61	20 mm PE 100 pipe	MTR	10.00	592.02	5920.20
62	32 mm PE 100 pipe	MTR	10.00	592.02	5920.20
63	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
64	32 mm PE 100 pipe	MTR	200.00	844.35	168870.00
65	63 mm PE 100 pipe	MTR	50.00	898.95	44947.50
66	90 mm PE 100 pipe	MTR	10.00	1339.65	13396.50
67	125 mm PE 100 pipe	MTR	10.00	1805.70	18057.00
68	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Hard rock)**				
69	20 mm PE 100 pipe	MTR	5.00	585.00	2925.00
70	32 mm PE 100 pipe	MTR	5.00	585.00	2925.00
71	63 mm PE 100 pipe	MTR	5.00	971.10	4855.50
72	90 mm PE 100 pipe	MTR	5.00	1636.05	8180.25
73	125 mm PE 100 pipe	MTR	5.00	2741.70	13708.50
74	**Pipeline Laying Through Moling(with casing) in unprepared surface (Hard rock)**				
75	20 mm PE 100 pipe	MTR	5.00	709.80	3549.00
76	32 mm PE 100 pipe	MTR	5.00	709.80	3549.00
77	**Pipeline Laying Through HDD (with casing) in unprepared surface (Hard rock)**				
78	32 mm PE 100 pipe	MTR	5.00	1168.05	5840.25
79	63 mm PE 100 pipe	MTR	5.00	2542.80	12714.00
80	90 mm PE 100 pipe	MTR	5.00	3864.90	19324.50
81	125 mm PE 100 pipe	MTR	5.00	5346.90	26734.50
82	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
83	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	NOS	100.00	3115.00	311500.00
84	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	NOS	5.00	4615.00	23075.00
85	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid. V) In case quantity increases beyond 4 meter payment towards additional length beyond 4 Mtr shall be paid as per releavant SOR item.				
86	**Restoration**				
87	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
88	Asphalting	MTR	75.00	600.00	45000.00
89	Cement Concrete	MTR	580.00	1196.00	693680.00
90	Tiles / Paver / Blocks / Curb Stones, Red sand stone	MTR	49.00	227.70	11157.30
91	Brick Soling / Channels, etc.	MTR	10.00	248.00	2480.00
92	RCC	MTR	10.00	1400.00	14000.00
93	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
94	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
95	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines**. **No additional payment shall be admissible against the same.**				
96	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				

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SCHEDULE OF RATES (Annexure-v)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
97	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
98	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
99	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
100	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
101	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
102	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
103	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
104	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
105	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
106	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
107	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
108	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
109	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
110	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
111	20 mm PE 100 pipe/32 mm PE 100 pipe	MTR	20.00	772.80	15456.00
112	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer-in-charge)**				
113	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
114	**GI Sleeves /Concrete Sleeves**				
115	2 $^{1}/_{2}$" NB, 1' Length	NOS	1.00	280.00	280.00
116	4" NB, 1' Length	NOS	1.00	501.00	501.00
117	**Concrete Sleeve (NP-2 Class)**				
118	4" NB, 3' Length	NOS	1.00	278.00	278.00
119	6" NB, 3' Length	NOS	1.00	447.00	447.00
120	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In-Charge / Owner				
121	**Installation of valve(Normal stem) in pit including supply of valves**				
122	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
123	PE Valve 32 mm dia	NOS	1.00	4450.00	4450.00
124	PE Valve 63 mm dia	NOS	1.00	10291.00	10291.00
125	PE Valve 90 mm dia	NOS	1.00	15319.00	15319.00
126	PE Valve 125mm dia	NOS	1.00	21968.00	21968.00
127	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
128	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	1.00	47250.50	47250.50
129	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
130	**Fabrication & Installation of Markers**				
131	**RCC Route Markers**				
132	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	50.00	473.00	23650.00
133	**Pole Markers with Foundation**				
134	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	1.00	2631.20	2631.20
135	**Warning Plate Markers**				
136	Supply, fabrication and installation of plate markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawing in technical volume to be installed near regulator.	NOS	100.00	489.50	48950.00
137	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				

GAIL_Internal

SCHEDULE OF RATES (Annexure-v)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
138	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	CUM	1.00	11740.00	11740.00
139	**GPR Survey (Scope includes submission of GPR survey report before/after obtaining permission for excavation from land owning agencies with complete satisfaction of the land owning agnency & Owner)**				
140	GPR Survey - Length up to 100 meter	NOS	1.00	8260.00	8260.00
141	GPR Survey - Length more than 100 meter	RM	101.00	81.00	8181.00
142	Note: In case the Ground Penetrating Radar (GPR) survey length exceeds 100 m at any location, payment for the survey length beyond the initial 100 m shall be made in addition to the applicable SOR item, at the per running metre rate derived from the corresponding SOR item.				
143	**Excavation of Hard rock/surface**				
144	Excavation of trench or pits, wherever hard rock presence is exceeding 1.5 m in any direction of the trench and excavation of trench or pits in Malba/Multiple layers of asphalt/ brick / PCC/RCC etc and removable only by pneumatic chisel / drill as per the specifications and direction of EIC. The rates are payable over and above the Laying rates as per relevant **SOR Item.**				
145	Cutting of PCC/RCC surface with thickness more than 12" or Continuous asphalt multi-layer/ Malba/ Brick / rock/ Boulders more than 24".(Malba shall be considered as a strata where soil is in mixed form of debris/building rubbish or discarded pieces of bricks/stones)	RM	1.00	126.00	126.00
146	**Additional Backfilling of Sand in excavated trench/Pit as per site requirement**				
147	Filling of M-Sand/Soft soil as per the site requirement and as per the instructions of EIC (except the sand padding as mentioned PE pipelime laying under SL No.2)	CUM	1.00	800.00	800.00
148	**CIVIL WORKS**				
149	**Earth Work** Earth in excavation and filling to the grades and levels shown in the approved drawings in all kinds of conditions including for Road embakments, using approved quality good earth from designated borrow area, for all heights and depths including clearing and stripping (min. 150 mm) of the area marked for filling, taking spot levels, consolidating the exposed natural soil surface, excavating the earth from borrow area loading, transporting & unloading, spreading in layers not exceeding 150 mm thickness, breaking clods, watering (if reqd.), ramming and compacting by manual/ mechanical means to give minimum 92% of modified Proctor's density of earth, testing & dressing including disposal of all unserviceable material all complete as per specifications and directions of Engineer-in-charge. (Rate to include cost of all labour, tools, tackles, equipment, hire chanrges, cost of borrow earth by way of royalties, right of way, cess etc., as applicable with all bye works and sundry works).	CUM	1.00	2312.20	2312.20
150	**PCC 1:2:4** 1 Cement : 2 Coarse sand : 4 stone aggregate 20mm nominal size.	CUM	1.00	3837.90	3837.90
151	**PCC 1:4:8** 1 Cement : 4 Coarse sand : 8 stone aggregate 40mm nominal size.	CUM	1.00	3092.10	3092.10
152	(Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials, shuttering, earthwork in excavation and backfilling using approved earth in all conditions etc. with all bye works and sundry works.)				
153	**Reinforced Cement Concrete**				
154	Providing and laying reinforced cement of grade M-25 with 20mm and down grade crushed stone aggregate in all types of structures like foundations, pedestals, pedestal bases, pipe supports, sleepers, column, equipment foundation, cable trench inlcuding construction joints, bitumen painting on surface in contact with soil, supplying and fixing reinforcing steel, shuttering, inserts, finishes etc. at all depths and heights complete as per drawings, specifications and direction of the Engineer-in-charge.	CUM	1.00	10417.00	10417.00
155	Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all maerials such as minimum 43 grade cement including sulphate resistant cement for sub-structures, R/F steel, Inserts, bolts, conduits, bitumen, other minor constrcution materials, shuttering, stanging, earthwork in excavation and backfilling using serviceable earth in all conditions, shorting bailing and pumping out water, testing of concrete, curing etc. with all bye works and sundry works.				
156	**Structural Works**				
157	**Providing and fixing Fencing Structure**				
158	Supplying, fabricating & fixing GI wire fencing fabricated from GI wire confirming to IS: and GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, including applying two coats of approved quality of synthetic enamel paint over a priming coat of in approved shade including supply of all raw materials, bolts, electrodes, transportation, including making pokets & pouring with PCC (1:2:4) in of block for fixing of posts etc including Y type angle and barbed wire (900 mm) complete as per enclosed drawing, technical specifications, scope of works and directions of the Engineer-In-Charge.				
159	Fencing height 2.1m alongwith barbed wire of height atleast 900 mm on Y type angle.	RM	1.00	2235.20	2235.20
160	**Providing and fixing Fencing Gates**				
161	Supplying, fabricating & fixing fencing gates fabricated from pipes conforming to IS:1161 and plates conforming to IS:2062 & fixing of GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, painting with enamel paint in approved shade including supply of all raw materials, bolts, electrodes, transportation etc complete as per enclosed sketch, technical specifications and directions of the Engineer-In-Charge.				
162	4m Wide x 2.1m High	NOS	1.00	45026.30	45026.30
163	3m Wide x 2.1m High	NOS	1.00	25727.90	25727.90
164	1m Wide x 2.1m High	NOS	1.00	11580.80	11580.80
165	**Preservation of Pipeline**				
166	**Preservation of pipeline sections and associated facilities (in event of delay in comissioning, other unforeseen reasons) including supply of nitrogen, all consumables, all equipment, man-power, etc. complete as per the requirements of specifications, other provisions of Contract document and instructions of Engineer-in-charge.**				
167	**By filling and pressurizing with nitrogen to a pressure of 2 bar(g) for a period of one month or part thereof.**				
168	For 125 mm Pipeline	MTR	10.00	11.70	117.00
169	For 90 mm Pipeline	MTR	10.00	10.14	101.40
170	For 63 mm Pipeline	MTR	10.00	8.58	85.80
171	For 32 mm Pipeline	MTR	10.00	7.02	70.20
172	For 20 mm Pipeline	MTR	10.00	6.24	62.40
173	**For every additional period of one month or part thereof Limited to 6 month**				
174	For 125 mm Pipeline	MTR	10.00	6.24	62.40
175	For 90 mm Pipeline	MTR	10.00	5.46	54.60
176	For 63 mm Pipeline	MTR	11.00	4.68	51.48
177	For 32 mm Pipeline	MTR	11.00	3.60	39.60
178	For 20 mm Pipeline	MTR	11.06	3.12	34.49
179	**Notes:** i) The above length is not for a single section but for no. of sections. ii) All accessrious ie; End caps and two nos tappings of 3/4 inches, PG to be considered per section and rate for the same shall be quoted by bidder under this item. iii) If month is partially complete, payment shall be made on prorata basis. iv) Scope includes pressure holding for a period of 6 months or as per EIC and jointing of PE pipe (if required) due to damage by any means and further filling of nitrogen for pressure holding.				

GAIL_Internal

SCHEDULE OF RATES (Annexure-v)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
180	**Liaisoning with Land Owning Agencies for Permission** Submission of applications as per approved drawing provided by owner / owner's representative (Initial Route survey, prepartion of drawing, measuring and providing details of surface type shall be in scope of contractor), obtaining and submission of demand note, coordination, Liaisoning, obtaining written permission from land owing agencies like NHAI, AAI,Indian Railways and any other government agencies who maintains the public lands and agencies owing Private lands etc. (all fee paid to authorities excluding demand charges or Bank Guarantees shall be reimbursed against documentary evidence). This rates are not applicable for Private lands i.e. Apartments etc. Permissions required from various authorities like NHAI / Railways / Irrigation (Canal) etc. falling enroute shall be inclusive in the item rate.	KM	1.00	14910.83	14910.83
181	**Installation of Service Regulator / Field Regulator: Installation & Fixing of regulator with associated inlet and outlet**				
182	**The scope also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).**				
183	Service Regulator installation - (4/6 bar to 100 mbar)	NOS	5.00	2750.00	13750.00
184	**Regulator Boxes: Supply including painting of approved make regulator boxes and installing them firmly by grouting using approved bracket /clamps as per drawing enclosed & as per specifications and and cleaning the area complete to the satisfaction.**				
185	Service Regulator Boxes: Supply and installation of Service Regulators Boxes as per drawing attached and as per directions of EIC.	NOS	1.00	3300.00	3300.00
186	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
187	4" TF	NOS	1.00	16516.50	16516.50
188	2" TF	NOS	1.00	3740.00	3740.00
189	1" TF	NOS	1.00	1072.50	1072.50
190	**Crossing of Sewage Drains/Nala alongside independent houses where drains/Nalas are being encountered adjacent to houses.**				
191	The scope of work includes supply of medium-duty GI casing pipes of 2.5 inches, along with padding with sandstone and civil works associated with the construction of cover slab as per std. drawing.	NOS	10.00	3465.00	34650.00
192	**General Note:** (i) The quantites of individual item can varied as per site requirement.The payment will be made as per actual certified measurement at site. For the supply items the quantities shall be procured after approval from client/ consultant/EIC. (ii) The bidder must indicate currency(ies) against each quoted item of the SOR. (iii) The total amount shall also be given by the bidder in the quoted currency(ies). (iv) Some of the may / may not be execute as per site requirements.				
193	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
194	20 mm PE 100 MDPE Pipeline	Meter	10.00	212.00	2120.00
195	32 mm PE 100 MDPE Pipeline	Meter	10.00	248.00	2480.00
196	63 mm PE 100 MDPE Pipeline	Meter	10.00	325.00	3250.00
197	90 mm PE 100 MDPE Pipeline	Meter	10.00	343.00	3430.00
198	125 mm PE 100 MDPE Pipeline	Meter	10.00	500.00	5000.00
199	**TOTAL VALUE (EXCLUDING GST)**				**50,00,000.00**

GAIL_Internal

Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Cuttack GA (Annexure-vi)

GAIL_Internal

SCHEDULE OF RATES (Annexure-vi)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	MTR	600.00	300.00	180000.00
28	32 mm PE 100 pipe	MTR	1280.00	300.00	384000.00
29	63 mm PE 100 pipe	MTR	50.00	352.50	17625.00
30	90 mm PE 100 pipe	MTR	10.00	442.50	4425.00
31	125 mm PE 100 pipe	MTR	10.00	532.50	5325.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	MTR	20.00	455.40	9108.00
34	32 mm PE 100 pipe	MTR	20.00	455.40	9108.00
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	MTR	2600.00	649.50	1688700.00
37	63 mm PE 100 pipe	MTR	300.00	691.50	207450.00
38	90 mm PE 100 pipe	MTR	100.00	1030.50	103050.00
39	125 mm PE 100 pipe	MTR	100.00	1389.00	138900.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				

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SCHEDULE OF RATES (Annexure-vi)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
41	20 mm PE 100 pipe	MTR	5.00	450.00	2250.00
42	32 mm PE 100 pipe	MTR	5.00	450.00	2250.00
43	63 mm PE 100 pipe	MTR	5.00	747.00	3735.00
44	90 mm PE 100 pipe	MTR	5.00	1258.50	6292.50
45	125 mm PE 100 pipe	MTR	5.00	2109.00	10545.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				
47	20 mm PE 100 pipe	MTR	5.00	546.00	2730.00
48	32 mm PE 100 pipe	MTR	5.00	546.00	2730.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	MTR	5.00	898.50	4492.50
51	63 mm PE 100 pipe	MTR	5.00	1956.00	9780.00
52	90 mm PE 100 pipe	MTR	5.00	2973.00	14865.00
53	125 mm PE 100 pipe	MTR	5.00	4113.00	20565.00
54	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Hard rock)**				
55	20 mm PE 100 pipe	MTR	150.00	390.00	58500.00
56	32 mm PE 100 pipe	MTR	250.00	390.00	97500.00
57	63 mm PE 100 pipe	MTR	10.00	458.25	4582.50
58	90 mm PE 100 pipe	MTR	9.00	575.25	5177.25
59	125 mm PE 100 pipe	MTR	10.00	692.25	6922.50
60	**Pipeline Laying Through Moling(without casing) in unprepared surface (Hard rock)**				
61	20 mm PE 100 pipe	MTR	10.00	592.02	5920.20
62	32 mm PE 100 pipe	MTR	10.00	592.02	5920.20
63	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
64	32 mm PE 100 pipe	MTR	200.00	844.35	168870.00
65	63 mm PE 100 pipe	MTR	50.00	898.95	44947.50
66	90 mm PE 100 pipe	MTR	10.00	1339.65	13396.50
67	125 mm PE 100 pipe	MTR	10.00	1805.70	18057.00
68	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Hard rock)**				
69	20 mm PE 100 pipe	MTR	5.00	585.00	2925.00
70	32 mm PE 100 pipe	MTR	5.00	585.00	2925.00
71	63 mm PE 100 pipe	MTR	5.00	971.10	4855.50
72	90 mm PE 100 pipe	MTR	5.00	1636.05	8180.25
73	125 mm PE 100 pipe	MTR	5.00	2741.70	13708.50
74	**Pipeline Laying Through Moling(with casing) in unprepared surface (Hard rock)**				
75	20 mm PE 100 pipe	MTR	5.00	709.80	3549.00
76	32 mm PE 100 pipe	MTR	5.00	709.80	3549.00
77	**Pipeline Laying Through HDD (with casing) in unprepared surface (Hard rock)**				
78	32 mm PE 100 pipe	MTR	5.00	1168.05	5840.25
79	63 mm PE 100 pipe	MTR	5.00	2542.80	12714.00
80	90 mm PE 100 pipe	MTR	5.00	3864.90	19324.50
81	125 mm PE 100 pipe	MTR	5.00	5346.90	26734.50
82	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
83	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	NOS	50.00	3115.00	155750.00
84	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	NOS	5.00	4615.00	23075.00
85	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid. V) In case quantity increases beyond 4 meter payment towards additional length beyond 4 Mtr shall be paid as per releavant SOR item.				
86	**Restoration**				
87	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
88	Asphalting	MTR	75.00	600.00	45000.00
89	Cement Concrete	MTR	800.00	1196.00	956800.00
90	Tiles / Paver / Blocks / Curb Stones, Red sand stone	MTR	49.00	227.70	11157.30
91	Brick Soling / Channels, etc.	MTR	10.00	248.00	2480.00
92	RCC	MTR	10.00	1400.00	14000.00
93	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
94	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
95	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines. No additional payment shall be admissible against the same.**				
96	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
97	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
98	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
99	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
100	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				

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SCHEDULE OF RATES (Annexure-vi)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
101	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
102	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
103	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
104	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
105	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
106	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
107	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
108	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
109	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
110	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
111	20 mm PE 100 pipe/32 mm PE 100 pipe	MTR	20.00	772.80	15456.00
112	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer-in-charge)**				
113	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
114	**GI Sleeves /Concrete Sleeves**				
115	2 $^{1}/_{2}$" NB, 1' Length	NOS	1.00	280.00	280.00
116	4" NB, 1' Length	NOS	1.00	501.00	501.00
117	**Concrete Sleeve (NP-2 Class)**				
118	4" NB, 3' Length	NOS	1.00	278.00	278.00
119	6" NB, 3' Length	NOS	1.00	447.00	447.00
120	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In-Charge / Owner				
121	**Installation of valve(Normal stem) in pit including supply of valves**				
122	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
123	PE Valve 32 mm dia	NOS	1.00	4450.00	4450.00
124	PE Valve 63 mm dia	NOS	1.00	10291.00	10291.00
125	PE Valve 90 mm dia	NOS	1.00	15319.00	15319.00
126	PE Valve 125mm dia	NOS	1.00	21968.00	21968.00
127	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
128	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	1.00	47250.50	47250.50
129	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
130	**Fabrication & Installation of Markers**				
131	**RCC Route Markers**				
132	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	50.00	473.00	23650.00
133	**Pole Markers with Foundation**				
134	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	1.00	2631.20	2631.20
135	**Warning Plate Markers**				
136	Supply, fabrication and installation of plate markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawing in technical volume to be installed near regulator.	NOS	100.00	489.50	48950.00
137	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
138	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	CUM	1.00	11740.00	11740.00
139	**GPR Survey (Scope includes submission of GPR survey report before/after obtaining permission for excavation from land owning agencies with complete satisfaction of the land owning agnency & Owner)**				
140	GPR Survey - Length up to 100 meter	NOS	1.00	8260.00	8260.00
141	GPR Survey - Length more than 100 meter	RM	101.00	81.00	8181.00
142	Note: In case the Ground Penetrating Radar (GPR) survey length exceeds 100 m at any location, payment for the survey length beyond the initial 100 m shall be made in addition to the applicable SOR item, at the per running metre rate derived from the corresponding SOR item.				
143	**Excavation of Hard rock/surface**				
144	Excavation of trench or pits, wherever hard rock presence is exceeding 1.5 m in any direction of the trench and excavation of trench or pits in Malba/Multiple layers of asphalt/ brick / PCC/RCC etc and removable only by pneumatic chisel / drill as per the specifications and direction of EIC. The rates are payable over and above the Laying rates as per relevant **SOR Item.**				
145	Cutting of PCC/RCC surface with thickness more than 12" or Continuous asphalt multi-layer/ Malba/ Brick / rock/ Boulders more than 24".(Malba shall be considered as a strata where soil is in mixed form of debris/building rubbish or discarded pieces of bricks/stones)	RM	1.00	126.00	126.00
146	**Additional Backfilling of Sand in excavated trench/Pit as per site requirement**				
147	Filling of M-Sand/Soft soil as per the site requirement and as per the instructions of EIC (except the sand padding as mentioned PE pipelime laying under SL No.2)	CUM	1.00	800.00	800.00
148	**CIVIL WORKS**				

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SCHEDULE OF RATES (Annexure-vi)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
149	**Earth Work** Earth in excavation and filling to the grades and levels shown in the approved drawings in all kinds of conditions including for Road embakments, using approved quality good earth from designated borrow area, for all heights and depths including clearing and stripping (min. 150 mm) of the area marked for filling, taking spot levels, consolidating the exposed natural soil surface, excavating the earth from borrow area loading, transporting & unloading, spreading in layers not exceeding 150 mm thickness, breaking clods, watering (if reqd.), ramming and compacting by manual/ mechanical means to give minimum 92% of modified Proctor's density of earth, testing & dressing including disposal of all unserviceable material all complete as per specifications and directions of Engineer-in-charge. (Rate to include cost of all labour, tools, tackles, equipment, hire chanrges, cost of borrow earth by way of royalties, right of way, cess etc., as applicable with all bye works and sundry works).	CUM	1.00	2312.20	2312.20
150	**PCC 1:2:4** 1 Cement : 2 Coarse sand : 4 stone aggregate 20mm nominal size.	CUM	1.00	3837.90	3837.90
151	**PCC 1:4:8** 1 Cement : 4 Coarse sand : 8 stone aggregate 40mm nominal size.	CUM	1.00	3092.10	3092.10
152	(Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials, shuttering, earthwork in excavation and backfilling using approved earth in all conditions etc. with all bye works and sundry works.)				
153	**Reinforced Cement Concrete**				
154	Providing and laying reinforced cement of grade M-25 with 20mm and down grade crushed stone aggregate in all types of structures like foundations, pedestals, pedestal bases, pipe supports, sleepers, column, equipment foundation, cable trench inlcuding construction joints, bitumen painting on surface in contact with soil, supplying and fixing reinforcing steel, shuttering, inserts, finishes etc. at all depths and heights complete as per drawings, specifications and direction of the Engineer-in-charge.	CUM	1.00	10417.00	10417.00
155	Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all maerials such as minimum 43 grade cement including sulphate resistant cement for sub-structures, R/F steel, Inserts, bolts, conduits, bitumen, other minor constrcution materials, shuttering, stanging, earthwork in excavation and backfilling using serviceable earth in all conditions, shorting bailing and pumping out water, testing of concrete, curing etc. with all bye works and sundry works.				
156	**Structural Works**				
157	**Providing and fixing Fencing Structure**				
158	Supplying, fabricating & fixing GI wire fencing fabricated from GI wire confirming to IS: and GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, including applying two coats of approved quality of synthetic enamel paint over a priming coat of in approved shade including supply of all raw materials, bolts, electrodes, transportation, including making pokets & pouring with PCC (1:2:4) in of block for fixing of posts etc including Y type angle and barbed wire (900 mm) complete as per enclosed drawing, technical specifications, scope of works and directions of the Engineer-In-Charge.				
159	Fencing height 2.1m alongwith barbed wire of height atleast 900 mm on Y type angle.	RM	1.00	2235.20	2235.20
160	**Providing and fixing Fencing Gates**				
161	Supplying, fabricating & fixing fencing gates fabricated from pipes conforming to IS:1161 and plates conforming to IS:2062 & fixing of GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, painting with enamel paint in approved shade including supply of all raw materials, bolts, electrodes, transportation etc complete as per enclosed sketch, technical specifications and directions of the Engineer-In-Charge.				
162	4m Wide x 2.1m High	NOS	1.00	45026.30	45026.30
163	3m Wide x 2.1m High	NOS	1.00	25727.90	25727.90
164	1m Wide x 2.1m High	NOS	1.00	11580.80	11580.80
165	**Preservation of Pipeline**				
166	**Preservation of pipeline sections and associated facilities (in event of delay in comissioning, other unforeseen reasons) including supply of nitrogen, all consumables, all equipment, man-power, etc. complete as per the requirements of specifications, other provisions of Contract document and instructions of Engineer-in-charge.**				
167	**By filling and pressurizing with nitrogen to a pressure of 2 bar(g) for a period of one month or part thereof.**				
168	For 125 mm Pipeline	MTR	10.00	11.70	117.00
169	For 90 mm Pipeline	MTR	10.00	10.14	101.40
170	For 63 mm Pipeline	MTR	10.00	8.58	85.80
171	For 32 mm Pipeline	MTR	10.00	7.02	70.20
172	For 20 mm Pipeline	MTR	10.00	6.24	62.40
173	**For every additional period of one month or part thereof Limited to 6 month**				
174	For 125 mm Pipeline	MTR	10.00	6.24	62.40
175	For 90 mm Pipeline	MTR	10.99	5.46	60.02
176	For 63 mm Pipeline	MTR	11.00	4.68	51.48
177	For 32 mm Pipeline	MTR	11.00	3.60	39.60
178	For 20 mm Pipeline	MTR	11.00	3.12	34.32
179	**Notes:** i) The above length is not for a single section but for no. of sections. ii) All accessrious ie; End caps and two nos tappings of 3/4 inches, PG to be considered per section and rate for the same shall be quoted by bidder under this item. iii) If month is partially complete, payment shall be made on prorata basis. iv) Scope includes pressure holding for a period of 6 months or as per EIC and jointing of PE pipe (if required) due to damage by any means and further filling of nitrogen for pressure holding.				
180	**Liaisoning with Land Owning Agencies for Permission** Submission of applications as per approved drawing provided by owner / owner's representative (Initial Route survey, prepartion of drawing, measuring and providing details of surface type shall be in scope of contractor), obtaining and submission of demand note, coordination, Liaisoning, obtaining written permission from land owing agencies like NHAI, AAI,Indian Railways and any other government agencies who maintains the public lands and agencies owing Private lands etc. (all fee paid to authorities excluding demand charges or Bank Guarantees shall be reimbursed against documentary evidence). This rates are not applicable for Private lands i.e. Apartments etc. Permissions required from various authorities like NHAI / Railways / Irrigation (Canal) etc. falling enroute shall be inclusive in the item rate.	KM	1.00	14910.83	14910.83
181	**Installation of Service Regulator / Field Regulator: Installation & Fixing of regulator with associated inlet and outlet**				
182	**The scope also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).**				
183	Service Regulator installation - (4/6 bar to 100 mbar)	NOS	5.00	2750.00	13750.00
184	**Regulator Boxes: Supply including painting of approved make regulator boxes and installing them firmly by grouting using approved bracket /clamps as per drawing enclosed & as per specifications and and cleaning the area complete to the satisfaction.**				
185	Service Regulator Boxes: Supply and installation of Service Regulators Boxes as per drawing attached and as per directions of EIC.	NOS	1.00	3300.00	3300.00
186	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
187	4" TF	NOS	1.00	16516.50	16516.50
188	2" TF	NOS	1.00	3740.00	3740.00
189	1" TF	NOS	1.00	1072.50	1072.50
190	**Crossing of Sewage Drains/Nala alongside independent houses where drains/Nalas are being encountered adjacent to houses.**				
191	The scope of work includes supply of medium-duty GI casing pipes of 2.5 inches, along with padding with sandstone and civil works associated with the construction of cover slab as per std. drawing.	NOS	10.00	3465.00	34650.00
192	**General Note:** (i) The quantites of individual item can varied as per site requirement.The payment will be made as per actual certified measurement at site. For the supply items the quantities shall be procured after approval from client/ consultant/EIC. (ii) The bidder must indicate currency(ies) against each quoted item of the SOR. (iii) The total amount shall also be given by the bidder in the quoted currency(ies). (iv) Some of the may / may not be execute as per site requirements.				

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SCHEDULE OF RATES (Annexure-vi)
Schedule of Rates (SOR) for Contract Award Value up to ₹50 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
193	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
194	20 mm PE 100 MDPE Pipeline	Meter	10.00	212.00	2120.00
195	32 mm PE 100 MDPE Pipeline	Meter	10.00	248.00	2480.00
196	63 mm PE 100 MDPE Pipeline	Meter	10.00	325.00	3250.00
197	90 mm PE 100 MDPE Pipeline	Meter	10.00	343.00	3430.00
198	125 mm PE 100 MDPE Pipeline	Meter	10.00	500.00	5000.00
199	**TOTAL VALUE (EXCLUDING GST)**				**50,00,000.00**

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Varanasi GA (Annexure-A)

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SCHEDULE OF RATES (Annexure-A)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	Meter	200.00	300.00	60000.00
28	32 mm PE 100 pipe	Meter	400.00	300.00	120000.00
29	63 mm PE 100 pipe	Meter	30.00	352.50	10575.00
30	90 mm PE 100 pipe	Meter	20.00	442.50	8850.00
31	125 mm PE 100 pipe	Meter	10.00	532.50	5325.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	Meter	400.00	455.40	182160.00
34	32 mm PE 100 pipe	Meter	1482.68	455.40	675214.50
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	Meter	1200.00	649.50	779400.00
37	63 mm PE 100 pipe	Meter	70.00	691.50	48405.00
38	90 mm PE 100 pipe	Meter	10.00	1030.50	10305.00
39	125 mm PE 100 pipe	Meter	10.00	1389.00	13890.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	Meter	1.00	450.00	450.00

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SCHEDULE OF RATES (Annexure-A)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
42	32 mm PE 100 pipe	Meter	1.00	450.00	450.00
43	63 mm PE 100 pipe	Meter	1.00	747.00	747.00
44	90 mm PE 100 pipe	Meter	1.00	1258.50	1258.50
45	125 mm PE 100 pipe	Meter	1.00	2109.00	2109.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				
47	20 mm PE 100 pipe	Meter	1.00	546.00	546.00
48	32 mm PE 100 pipe	Meter	1.00	546.00	546.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	Meter	1.00	898.50	898.50
51	63 mm PE 100 pipe	Meter	1.00	1956.00	1956.00
52	90 mm PE 100 pipe	Meter	1.00	2973.00	2973.00
53	125 mm PE 100 pipe	Meter	1.00	4113.00	4113.00
54	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Hard rock)**				
55	20 mm PE 100 pipe	Meter	1.00	390.00	390.00
56	32 mm PE 100 pipe	Meter	1.00	390.00	390.00
57	63 mm PE 100 pipe	Meter	1.00	458.25	458.25
58	90 mm PE 100 pipe	Meter	1.00	575.25	575.25
59	125 mm PE 100 pipe	Meter	1.00	692.25	692.25
60	**Pipeline Laying Through Moling(without casing) in unprepared surface (Hard rock)**				
61	20 mm PE 100 pipe	Meter	1.00	592.02	592.02
62	32 mm PE 100 pipe	Meter	1.00	592.02	592.02
63	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
64	32 mm PE 100 pipe	Meter	1.00	844.35	844.35
65	63 mm PE 100 pipe	Meter	1.00	898.95	898.95
66	90 mm PE 100 pipe	Meter	1.00	1339.65	1339.65
67	125 mm PE 100 pipe	Meter	1.00	1805.70	1805.70
68	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Hard rock)**				
69	20 mm PE 100 pipe	Meter	1.00	585.00	585.00
70	32 mm PE 100 pipe	Meter	1.00	585.00	585.00
71	63 mm PE 100 pipe	Meter	1.00	971.10	971.10
72	90 mm PE 100 pipe	Meter	1.00	1636.05	1636.05
73	125 mm PE 100 pipe	Meter	1.00	2741.70	2741.70
74	**Pipeline Laying Through Moling(with casing) in unprepared surface (Hard rock)**				
75	20 mm PE 100 pipe	Meter	1.00	709.80	709.80
76	32 mm PE 100 pipe	Meter	1.00	709.80	709.80
77	**Pipeline Laying Through HDD (with casing) in unprepared surface (Hard rock)**				
78	32 mm PE 100 pipe	Meter	1.00	1168.05	1168.05
79	63 mm PE 100 pipe	Meter	1.00	2542.80	2542.80
80	90 mm PE 100 pipe	Meter	1.00	3864.90	3864.90
81	125 mm PE 100 pipe	Meter	1.00	5346.90	5346.90
82	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
83	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	NOS	12.00	3115.00	37380.00
84	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	NOS	8.00	4615.00	36920.00
85	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid. V) In case quantity increases beyond 4 meter payment towards additional length beyond 4 Mtr shall be paid as per releavant SOR item.				
86	**Restoration**				
87	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
89	Cement Concrete	Meter	25.00	1196.00	29900.00
90	Tiles / Paver / Blocks / Curb Stones, Red sand stone	Meter	200.00	227.70	45540.00
91	Brick Soling / Channels, etc.	Meter	1.00	248.00	248.00
92	RCC	Meter	10.00	1400.00	14000.00
93	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
94	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
95	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines**. **No additional payment shall be admissible against the same.**				
96	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
97	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
98	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
99	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
100	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				

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SCHEDULE OF RATES (Annexure-A)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
101	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
102	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
103	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
104	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
105	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
106	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
107	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
108	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
109	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
110	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
111	20 mm PE 100 pipe/32 mm PE 100 pipe	Meter	5.00	772.80	3864.00
112	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer- in-charge)**				
113	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
114	**GI Sleeves /Concrete Sleeves**				
115	2 $^{1}/_{2}$" NB, 1' Length	NOS	4.00	280.00	1120.00
116	4" NB, 1' Length	NOS	1.00	501.00	501.00
117	**Concrete Sleeve (NP-2 Class)**				
118	4" NB, 3' Length	NOS	1.00	278.00	278.00
119	6" NB, 3' Length	NOS	1.00	447.00	447.00
120	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In- Charge / Owner				
121	**Installation of valve(Normal stem) in pit including supply of valves**				
122	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
123	PE Valve 32 mm dia	NOS	2.00	4450.00	8900.00
124	PE Valve 63 mm dia	NOS	0.50	10291.00	5145.50
125	PE Valve 90 mm dia	NOS	0.50	15319.00	7659.50
126	PE Valve 125mm dia	NOS	0.50	21968.00	10984.00
133	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
135	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	1.00	47250.50	47250.50
136	Tvpe I : Inside size minimum 1500 mm x 1000 mm	NOS	0.50	74813.20	37406.60
137	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
138	**Fabrication & Installation of Markers**				
139	**RCC Route Markers**				
140	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	20.00	473.00	9460.00
141	**Pole Markers with Foundation**				
142	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	5.00	2631.20	13156.00
143	**Warning Plate Markers**				
144	Supply, fabrication and installation of plate markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawing in technical volume to be installed near regulator.	NOS	1.00	489.50	489.50
145	**Paver Block-Tiles Markers**				
146	Supply, fabrication and installation of Pvaer Block-Tiles markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawings to be installed on Paver Block/Tiles on foot Path/As per the instruction of EIC.	NOS	1.00	457.60	457.60
147	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
148	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	CUM	0.50	11740.00	5870.00
149	**GPR Survey (Scope includes submission of GPR survey report before/after obtaining permission for excavation from land owning agencies with complete satisfaction of the land owning agnency & Owner)**				
150	GPR Survey - Length up to 100 meter	NOS	1.00	8260.00	8260.00
151	GPR Survey - Length more than 100 meter	RM	5.00	81.00	405.00
152	Note: In case the Ground Penetrating Radar (GPR) survey length exceeds 100 m at any location, payment for the survey length beyond the initial 100 m shall be made in addition to the applicable SOR item, at the per running metre rate derived from the corresponding SOR item.				
153	**Excavation of Hard rock/surface**				
154	Excavation of trench or pits, wherever hard rock presence is exceeding 1.5 m in any direction of the trench and excavation of trench or pits in Malba/Multiple layers of asphalt/ brick / PCC/RCC etc and removable only by pneumatic chisel / drill as per the specifications and direction of EIC. The rates are payable over and above the Laying rates as per relevant **SOR Item.**				
155	Cutting of PCC/RCC surface with thickness more than 12" or Continuous asphalt multi-layer/ Malba/ Brick / rock/ Boulders more than 24".(Malba shall be considered as a strata where soil is in mixed form of debris/building rubbish or discarded pieces of bricks/stones)	RM	1.00	126.00	126.00
156	**Additional Backfilling of Sand in excavated trench/Pit as per site requirement**				

GAIL_Internal

SCHEDULE OF RATES (Annexure-A)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
157	Filling of M-Sand/Soft soil as per the site requirement and as per the instructions of EIC (except the sand padding as mentioned PE pipelime laying under SL No.2)	CUM	1.00	800.00	800.00
158	**DRS/DCU/DRS cum DCU works**				
159	**Installation of DRS/DCU/DRS cum DCU**				
160	Receiving and taking over, handling, loading, transportation and unloading of DRS/DCU/DRS cum DCU from Owner's designated stockyards to site, installation at foundation (including supply of all structural items) and hooking up with PE pipe including all works as required to complete the job as per the drawings and specification, scope of work mentioned in tender doucment. The scope includes supply of transition fittings and other PE and CS fittings as per requirements and various associated works (including steel welding) to commission DRS/DCU/DRS cum DCU. Note: 1) Amount towards civil work shall be payable as per related SOR items. 2) Rate to include cost of all labour, tools, tackles, equipment, hire charges. 3) Bolts, nuts, washer, U-clamps, gaskets etc. if required during installation shall be procured and supplied by the Contractor within the rate quoted. These items shall not be separately measured and paid.				
161	DCU/DRS cum DCU. (Maximum weight of single DCU/DRS cum DCU shall be about 6.0 to 12 T)	NOS	0.50	54450.00	27225.00
162	**Note:** i) The quantities mentioned are indicative only. ii) For all the supply items mentioned above, procurement shall be made as per specification after due approval of engineer- in - charge.				
163	**CIVIL WORKS**				
164	**Earth Work** Earth in excavation and filling to the grades and levels shown in the approved drawings in all kinds of conditions including for Road embakments, using approved quality good earth from designated borrow area, for all heights and depths including clearing and stripping (min. 150 mm) of the area marked for filling, taking spot levels, consolidating the exposed natural soil surface, excavating the earth from borrow area loading, transporting & unloading, spreading in layers not exceeding 150 mm thickness, breaking clods, watering (if reqd.), ramming and compacting by manual/ mechanical means to give minimum 92% of modified Proctor's density of earth, testing & dressing including disposal of all unserviceable material all complete as per specifications and directions of Engineer-in-charge. (Rate to include cost of all labour, tools, tackles, equipment, hire chanrges, cost of borrow earth by way of royalties, right of way, cess etc., as applicable with all bye works and sundry works).	CUM	1.00	2312.20	2312.20
165	**PCC 1:2:4** 1 Cement : 2 Coarse sand : 4 stone aggregate 20mm nominal size.	CUM	1.00	3837.90	3837.90
166	**PCC 1:4:8** 1 Cement : 4 Coarse sand : 8 stone aggregate 40mm nominal size.	CUM	1.00	3092.10	3092.10
167	(Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials, shuttering, earthwork in excavation and backfilling using approved earth in all conditions etc. with all bye works and sundry works.)				
168	**Reinforced Cement Concrete**				
169	Providing and laying reinforced cement of grade M-25 with 20mm and down grade crushed stone aggregate in all types of structures like foundations, pedestals, pedestal bases, pipe supports, sleepers, column, equipment foundation, cable trench inlcuding construction joints, bitumen painting on surface in contact with soil, supplying and fixing reinforcing steel, shuttering, inserts, finishes etc. at all depths and heights complete as per drawings, specifications and direction of the Engineer-in-charge.	CUM	0.50	10417.00	5208.50
170	Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all maerials such as minimum 43 grade cement including sulphate resistant cement for sub-structures, R/F steel, Inserts, bolts, conduits, bitumen, other minor constrcution materials, shuttering, stanging, earthwork in excavation and backfilling using serviceable earth in all conditions, shorting bailing and pumping out water, testing of concrete, curing etc. with all bye works and sundry works.				
171	**Brick Work**				
172	Providing brick work with brick class designation M-7.5 of IS:1077 in cm1:4 (1 cement : 4 sand) in steps, walls, retaining walls and load bearing structures drains, or any shape with all lead, depths & height including curring, scaffolding, etc., as per specifications and drawings with all bye-works and direction of the Enfineer-in-charge.	CUM	1.00	3954.50	3954.50
173	(Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials such as minimum 43 grade cement, bricks, finishes, bitumen, other minor constrcution materials, shuttering, staging, masonry work, plastering, painting etc. with all bye-works and sundry works).				
174	**Note:** The quantites of individual item can varied as per site requirement.The payment will be made as per actual certified measurement at site.				
175	**Laying of Brick layer/ Concrete**				
176	**Providing single layer of Brick / Concrete / or impact resistant tape to entire width of trench above Warning Mat placed in trench over the laid pipeline as per OISD 226, standard drawing, specification and instruction of Owner. (Rate to include cost of all labour, tools, tackles, equipment, hire charges & supply of all materials, etc)**				
177	Brick Layer for width of PE pipeline trench as per drawing (75 mm thk.)	SQM	1.00	177.10	177.10
178	Concrete for width of PE pipeline trench as per drawing (80 mm thk.)	SQM	1.00	268.40	268.40
179	**Demolition of PCC work below plinth level**				
180	Demolishing plain cement concrete (PCC) work (taking all necessary safety precautions) for all depths below plinth level including supply of all tools & tackles, necessary scaffolding, propping, underpinning, etc. , disposal of unserviceable material outside the boundary limits keeping the owner indemnified of any liabilities from statutory/ local bodies, all complete work as specified and directed	CUM	1.00	1521.30	1521.30
181	**Excavation for foundation works**				
182	Excavation as per plan, upto 3 meters and upto any lead in all conditions, backfilling using serviceable earth and disposal of surplus and unserviceable earth. Soil to be levelled and neatly dressed complete in all respect as per scope of work, technical specification and directions of EIC.				
183	Upto 3.0 Mtrs	CUM	1.00	1064.80	1064.80
184	Dismantling of RCC & cutting of reinforcement (Thickness above 3")	CUM	1.00	1850.20	1850.20
185	**Structural Works**				
186	**Providing and fixing Fencing Structure**				
187	Supplying, fabricating & fixing GI wire fencing fabricated from GI wire confirming to IS: and GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, including applying two coats of approved quality of synthetic enamel paint over a priming coat of in approved shade including supply of all raw materials, bolts, electrodes, transportation, including making pokets & pouring with PCC (1:2:4) in of block for fixing of posts etc including Y type angle and barbed wire (900 mm) complete as per enclosed drawing, technical specifications, scope of works and directions of the Engineer-In-Charge.				
188	Fencing height 2.1m alongwith barbed wire of height atleast 900 mm on Y type angle.	RM	0.50	2235.20	1117.60
189	**Providing and fixing Fencing Gates**				
190	Supplying, fabricating & fixing fencing gates fabricated from pipes conforming to IS:1161 and plates conforming to IS:2062 & fixing of GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, painting with enamel paint in approved shade including supply of all raw materials, bolts, electrodes, transportation etc complete as per enclosed sketch, technical specifications and directions of the Engineer-In- Charge.				
191	4m Wide x 2.1m High	NOS	0.50	45026.30	22513.15
192	3m Wide x 2.1m High	NOS	0.50	25727.90	12863.95
193	1m Wide x 2.1m High	NOS	0.50	11580.80	5790.40
194	**Fencing for wall mounted skid for Industrial/Commercial** Supplying, transporting, fabricating, and fixing GI welded mesh fencing with a thickness of not less than 18 gauge (50x50 mm) and a GI structural steel frame of size 35mm x 35mm, assembled by welding or bolting. The fencing includes a double-door facility and the provision of all required raw materials, such as bolts, electrodes, hinges, locking arrangements, and anchoring with appropriately sized bolts as necessary. The work also includes applying two coats of enamel paint (Asian/Berger paint) and completing all tasks as per the scope of work and directions of the Engineer-In-Charge. Fabrication drawings, based on site conditions, must be approved by the Engineer-In-Charge before execution of the work.	KG	1.00	165.00	165.00
195	**Preservation of Pipeline**				
196	**Preservation of pipeline sections and associated facilities (in event of delay in comissioning, other unforeseen reasons) including supply of nitrogen, all consumables, all equipment, man-power, etc. complete as per the requirements of specifications, other provisions of Contract document and instructions of Engineer-in-charge.**				

GAIL_Internal

SCHEDULE OF RATES (Annexure-A)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
197	**By filling and pressurizing with nitrogen to a pressure of 2 bar(g) for a period of one month or part thereof.**				
198	For 125 mm Pipeline	Meter	1.00	11.70	11.70
199	For 90 mm Pipeline	Meter	1.00	10.14	10.14
200	For 63 mm Pipeline	Meter	1.00	8.58	8.58
201	For 32 mm Pipeline	Meter	1.00	7.02	7.02
202	For 20 mm Pipeline	Meter	1.00	6.24	6.24
203	**For every additional period of one month or part thereof Limited to 6 month**				
204	For 125 mm Pipeline	Meter	1.00	6.24	6.24
205	For 90 mm Pipeline	Meter	1.00	5.46	5.46
206	For 63 mm Pipeline	Meter	1.00	4.68	4.68
207	For 32 mm Pipeline	Meter	1.00	3.60	3.60
208	For 20 mm Pipeline	Meter	1.00	3.12	3.12
209	**Notes:** i) The above length is not for a single section but for no. of sections. ii) All accessrious ie; End caps and two nos tappings of 3/4 inches, PG to be considered per section and rate for the same shall be quoted by bidder under this item. iii) If month is partially complete, payment shall be made on prorata basis. iv) Scope includes pressure holding for a period of 6 months or as per EIC and jointing of PE pipe (if required) due to damage by any means and further filling of nitrogen for pressure holding.				
210	**Liaisoning with Land Owning Agencies for Permission** Submission of applications as per approved drawing provided by owner / owner's representative (Initial Route survey, prepartion of drawing, measuring and providing details of surface type shall be in scope of contractor), obtaining and submission of demand note, coordination, Liaisoning, obtaining written permission from land owing agencies like NHAI, AAI,Indian Railways and any other government agencies who maintains the public lands and agencies owing Private lands etc. (all fee paid to authorities excluding demand charges or Bank Guarantees shall be reimbursed against documentary evidence). This rates are not applicable for Private lands i.e. Apartments etc. Permissions required from various authorities like NHAI / Railways / Irrigation (Canal) etc. falling enroute shall be inclusive in the item rate.	KM	1.00	14910.83	14910.83
211	**Installation of GI Service Pipe (For Commercial Connection and Installaton of Service Regulator)**				
212	Supply, loading, storing, unloading and laying of GI pipes, including supply of GI fittings/accessories of all sizes & thickness like Elbows, Tees, unions, sockets, reducers, GI plugs, sleeves etc., installation of GI line (alongwith installation of required accessories as mentioned above) of following sizes, including fabrication with supply of all materials, consumables, labour and other incidental works. Carrying out all temporary, ancillary, auxiliary works required to make the GI line ready for commissioning as per drawings specifications.				
213	Finalisation of optimum route with consent of customer, from transition fitting to cooking oven/ appliance.				
214	Making temporay but stable platforms/ scaffolding/ rope ladders and all other safety devices.				
215	Installation of GI Pipes, Fittings, Valves, warning plate including NPT threading, painting as specified (installation of meters & regulators forms a separate SOR item).				
216	Drillings of holes through walls (Brick, RCC), Granite, Marble, Glass Cutting with proper heavy duty hammer drill machine tools and tackeles, using proper sealent /grout materialed colors to match the original replacement of damages during drillling, restoring the area to original condition.				
217	Supply & Fixing of approved clamps, Dowell Plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape/ lock tight, drilling of holes through tiles/ wood/ marble/ Granite etc. jointing of PE to above Ground service GI pipes, testing, purging with Nitrogen and commissioning of the complete installation as per specification.				
218	Painting of entire length of pipe along with fittings after proper surface finish by one coat of approved primer paint and two coats of approved synthetic enamel paint complete as per specification & direction of EIC. Restoring the wall surface to origin				
219	All above activities to be carried out as per specification to the complete satisfaction of consumer & as desired by Engineer-in-charge.				
220	Handing over the completed works to Client for operation/ use, reconciliation of material area wise.				
221	Any other activity not mentioned/ covered, explicitly above, but otherwise required for satisfactory completion/ safety/ statutory/ maintenance of works shall also be covered under scope of work and has to be completed by contractor within specified schedule time.				
222	2" CS Pipe : commercial and service regulator connections (Supply in the scope of the contractor)	Meter	2.00	1501.50	3003.00
223	1" CS Pipe : commercial and service regulator connections (Supply in the scope of the contractor)	Meter	1.00	1210.00	1210.00
224	3/4"GI Pipe: commercial and service regulator connections (Supply in the scope of the contractor)	Meter	1.00	632.50	632.50
225	1/2" GI Pipe :commercial and service regulator connections (Supply in the scope of the contractor)	Meter	1.00	522.50	522.50
226	Installation of Commercial/Industrial Regulators and Meters of various sizes and capacities and Flexible Hoses including conversion of burners. The scope of work includes supply of all items required items (Only Meters and Regulators shall be provided as free issue) and all associated works. **(Diaphragm Meter)**	NOS	1.00	6600.00	6600.00
227	Installation of Commercial/Industrial Regulators and Meters of various sizes and capacities and Flexible Hoses including conversion of burners. The scope of work includes supply of all items required (Only Meters and Regulators shall be provided as free issue) and all associated works. **(RPD Meter)** Including supply, installation of #150 Flange of size 3"/2"/1.5"/1" (2 set with meter and 2 set with regulator), Stud-Nut, Gaskets, Elbow, L-Clamp, Grouting, Reducer, U-Clamp with rubber, and 01 Pressure Guage (0-4.2 Kg/Cm2) of reputed make and to the satisfaction of EIC. Works include installation of Free issued Strainer, NRV in all respects.	NOS	1.00	30800.00	30800.00
228	**Supply and installation of Valves including flanges, gasket, stud bolt etc as required.**				
229	**Supply and installation of Isolation Valves as per Technical Specification and as directed by EIC,(Approved make L&T/Audco or as mentioned in tender)**				
230	Isolation Ball Valve 3 " max. 6 bar (g)	NOS	0.50	24750.00	12375.00
231	Isolation Ball Valve 2 " max. 6 bar (g)	NOS	0.50	16500.00	8250.00
232	Isolation Ball Valve 1 " max. 6 bar (g)(Threaded)	NOS	1.00	2750.00	2750.00
233	Isolation Ball Valve 1 " max. 6 bar (g)(Flanged)	NOS	1.00	8250.00	8250.00
234	Isolation Ball Valve 3/4 " max. 6 bar (g)	NOS	1.00	466.40	466.40
235	Isolation Ball Valve 1/2" max. 6 bar (g)	NOS	1.00	295.90	295.90
236	**Installation of Service Regulator / Field Regulator: Installation & Fixing of regulator with associated inlet and outlet**				
237	**The scope also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).**				
238	Service Regulator installation - (4/6 bar to 100 mbar)	NOS	1.00	2750.00	2750.00
239	**Regulator Boxes: Supply including painting of approved make regulator boxes and installing them firmly by grouting using approved bracket /clamps as per drawing enclosed & as per specifications and and cleaning the area complete to the satisfaction.**				
240	Service Regulator Boxes: Supply and installation of Service Regulators Boxes as per drawing attached and as per directions of EIC.	NOS	1.00	3300.00	3300.00
241	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
242	4" TF	NOS	0.50	16516.50	8258.25
243	2" TF	NOS	1.00	3740.00	3740.00
244	1" TF	NOS	1.00	1072.50	1072.50
245	**Crossing of Sewage Drains/Nala alongside independent houses where drains/Nalas are being encountered adjacent to houses.**				
246	The scope of work includes supply of medium-duty GI casing pipes of 2.5 inches, along with padding with sandstone and civil works associated with the construction of cover slab as per std. drawing.	NOS	1.00	3465.00	3465.00
247	**General Note:** (i) The quantites of individual item can varied as per site requirement.The payment will be made as per actual certified measurement at site. For the supply items the quantities shall be procured after approval from client/ consultant/EIC. (ii) The bidder must indicate currency(ies) against each quoted item of the SOR. (iii) The total amount shall also be given by the bidder in the quoted currency(ies). (iv) Some of the may / may not be execute as per site requirements.				
248	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				

GAIL_Internal

SCHEDULE OF RATES (Annexure-A)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Varanasi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
249	20 mm PE 100 MDPE Pipeline	Meter	5.00	212.00	1060.00
250	32 mm PE 100 MDPE Pipeline	Meter	5.00	248.00	1240.00
251	63 mm PE 100 MDPE Pipeline	Meter	5.00	325.00	1625.00
252	90 mm PE 100 MDPE Pipeline	Meter	5.00	343.00	1715.00
253	125 mm PE 100 MDPE Pipeline	Meter	5.00	500.00	2500.00
254	**TOTAL VALUE (EXCLUDING GST)**				**25,00,000.00**

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Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Patna GA (Annexure-B)

GAIL_Internal

SCHEDULE OF RATES (Annexure-B)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Patna GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	Meter	10.00	300.00	3000.00
28	32 mm PE 100 pipe	Meter	100.00	300.00	30000.00
29	63 mm PE 100 pipe	Meter	100.00	352.50	35250.00
30	90 mm PE 100 pipe	Meter	10.00	442.50	4425.00
31	125 mm PE 100 pipe	Meter	10.00	532.50	5325.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	Meter	100.00	455.40	45540.00
34	32 mm PE 100 pipe	Meter	1000.00	455.40	455400.00
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	Meter	1290.00	649.50	837855.00
37	63 mm PE 100 pipe	Meter	850.00	691.50	587775.00
38	90 mm PE 100 pipe	Meter	50.00	1030.50	51525.00
39	125 mm PE 100 pipe	Meter	10.00	1389.00	13890.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	Meter	1.00	450.00	450.00
42	32 mm PE 100 pipe	Meter	25.00	450.00	11250.00
43	63 mm PE 100 pipe	Meter	25.00	747.00	18675.00
44	90 mm PE 100 pipe	Meter	1.00	1258.50	1258.50
45	125 mm PE 100 pipe	Meter	1.00	2109.00	2109.00

GAIL_Internal

SCHEDULE OF RATES (Annexure-B)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Patna GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				
47	20 mm PE 100 pipe	Meter	1.00	546.00	546.00
48	32 mm PE 100 pipe	Meter	1.00	546.00	546.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	Meter	1.00	898.50	898.50
51	63 mm PE 100 pipe	Meter	1.00	1956.00	1956.00
52	90 mm PE 100 pipe	Meter	1.00	2973.00	2973.00
53	125 mm PE 100 pipe	Meter	1.00	4113.00	4113.00
54	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing **,** payment for length of PE pipe will be done as per casing pipe length.				
55	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	Nos	2.00	3115.00	6230.00
56	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	Nos	2.00	4615.00	9230.00
57	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid.				
58	**Restoration**				
59	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
60	Asphalting	Meter	5.00	600.00	3000.00
61	Cement Concrete	Meter	150.00	1196.00	179400.00
62	Tiles / Paver / Blocks / Curb Stones, Red sand stone	Meter	5.00	227.70	1138.50
63	Brick Soling / Channels, etc.	Meter	5.00	248.00	1240.00
64	RCC	Meter	5.00	1400.00	7000.00
65	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
66	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
67	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines**. **No additional payment shall be admissible against the same.**				
68	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
69	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
70	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
71	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
72	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
73	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD-226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
74	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
75	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
76	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
77	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
78	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
79	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
80	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
81	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
82	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
83	20 mm PE 100 pipe/32 mm PE 100 pipe	Meter	5.00	772.80	3864.00
84	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer-in-charge)**				
85	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
86	**GI Sleeves /Concrete Sleeves**				
87	2 $^{1}/_{2}$" NB, 1' Length	Nos	1.00	280.00	280.00
88	4" NB, 1' Length	Nos	1.00	501.00	501.00
89	**Concrete Sleeve (NP-2 Class)**				
90	4" NB, 3' Length	Nos	1.00	278.00	278.00

GAIL_Internal

SCHEDULE OF RATES (Annexure-B)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Patna GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
91	6" NB, 3' Length	Nos	1.00	447.00	447.00
92	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In- Charge / Owner				
93	**Installation of valve(Normal stem) in pit including supply of valves**				
94	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
95	PE Valve 32 mm dia	Nos	2.00	4450.00	8900.00
96	PE Valve 63 mm dia	Nos	1.00	10291.00	10291.00
97	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
98	Type-I having Internal size of Minimum 600 x 600mm	Nos	3.00	31000.00	93000.00
99	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
100	**Fabrication & Installation of Markers**				
101	**RCC Route Markers**				
102	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	Nos	40.00	473.00	18920.00
103	**Pole Markers with Foundation**				
104	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	Nos	4.00	2631.20	10524.80
105	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
106	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	Cum	1.00	11740.00	11740.00
107	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
108	1" TF	Nos	1.00	1072.50	1072.50
109	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
110	20 mm PE 100 MDPE Pipeline	Meter	10.00	212.00	2120.00
111	32 mm PE 100 MDPE Pipeline	Meter	15.00	248.00	3720.00
112	63 mm PE 100 MDPE Pipeline	Meter	15.00	325.00	4875.00
113	90 mm PE 100 MDPE Pipeline	Meter	21.77	343.00	7468.20
114	**TOTAL VALUE (EXCLUDING GST)**				**25,00,000.00**

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Ranchi GA (Annexure-C)

GAIL_Internal

SCHEDULE OF RATES (Annexure-C)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Ranchi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	Meter	10.00	300.00	3000.00
28	32 mm PE 100 pipe	Meter	100.00	300.00	30000.00
29	63 mm PE 100 pipe	Meter	100.00	352.50	35250.00
30	90 mm PE 100 pipe	Meter	10.00	442.50	4425.00
31	125 mm PE 100 pipe	Meter	10.00	532.50	5325.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	Meter	100.00	455.40	45540.00
34	32 mm PE 100 pipe	Meter	1010.73	455.40	460284.66
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	Meter	1200.00	649.50	779400.00
37	63 mm PE 100 pipe	Meter	850.00	691.50	587775.00
38	90 mm PE 100 pipe	Meter	50.00	1030.50	51525.00
39	125 mm PE 100 pipe	Meter	10.00	1389.00	13890.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	Meter	1.00	450.00	450.00
42	32 mm PE 100 pipe	Meter	25.00	450.00	11250.00
43	63 mm PE 100 pipe	Meter	25.00	747.00	18675.00

GAIL_Internal

SCHEDULE OF RATES (Annexure-C)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Ranchi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
44	90 mm PE 100 pipe	Meter	1.00	1258.50	1258.50
45	125 mm PE 100 pipe	Meter	1.00	2109.00	2109.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				0.00
47	20 mm PE 100 pipe	Meter	1.00	546.00	546.00
48	32 mm PE 100 pipe	Meter	1.00	546.00	546.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	Meter	1.00	898.50	898.50
51	63 mm PE 100 pipe	Meter	1.00	1956.00	1956.00
52	90 mm PE 100 pipe	Meter	1.00	2973.00	2973.00
53	125 mm PE 100 pipe	Meter	1.00	4113.00	4113.00
54	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Hard rock)**				
55	20 mm PE 100 pipe	Meter	1.00	390.00	390.00
56	32 mm PE 100 pipe	Meter	50.00	390.00	19500.00
57	63 mm PE 100 pipe	Meter	25.00	458.25	11456.25
58	90 mm PE 100 pipe	Meter	1.00	575.25	575.25
59	125 mm PE 100 pipe	Meter	1.00	692.25	692.25
60	**Pipeline Laying Through Moling(without casing) in unprepared surface (Hard rock)**				
61	20 mm PE 100 pipe	Meter	1.00	592.02	592.02
62	32 mm PE 100 pipe	Meter	1.00	592.02	592.02
63	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
64	32 mm PE 100 pipe	Meter	1.00	844.35	844.35
65	63 mm PE 100 pipe	Meter	1.00	898.95	898.95
66	90 mm PE 100 pipe	Meter	1.00	1339.65	1339.65
67	125 mm PE 100 pipe	Meter	1.00	1805.70	1805.70
68	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Hard rock)**				
69	20 mm PE 100 pipe	Meter	1.00	585.00	585.00
70	32 mm PE 100 pipe	Meter	1.00	585.00	585.00
71	63 mm PE 100 pipe	Meter	1.00	971.10	971.10
72	90 mm PE 100 pipe	Meter	1.00	1636.05	1636.05
73	125 mm PE 100 pipe	Meter	1.00	2741.70	2741.70
74	**Pipeline Laying Through Moling(with casing) in unprepared surface (Hard rock)**				
75	20 mm PE 100 pipe	Meter	1.00	709.80	709.80
76	32 mm PE 100 pipe	Meter	1.00	709.80	709.80
77	**Pipeline Laying Through HDD (with casing) in unprepared surface (Hard rock)**				
78	32 mm PE 100 pipe	Meter	1.00	1168.05	1168.05
79	63 mm PE 100 pipe	Meter	1.00	2542.80	2542.80
80	90 mm PE 100 pipe	Meter	1.00	3864.90	3864.90
81	125 mm PE 100 pipe	Meter	1.00	5346.90	5346.90
82	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
83	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	NOS	2.00	3115.00	6230.00
84	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	NOS	2.00	4615.00	9230.00
85	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid.				
86	**Restoration**				
87	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
88	Asphalting	Meter	5.00	600.00	3000.00
89	Cement Concrete	Meter	150.00	1196.00	179400.00
90	Tiles / Paver / Blocks / Curb Stones, Red sand stone	Meter	5.00	227.70	1138.50
91	Brick Soling / Channels, etc.	Meter	5.00	248.00	1240.00
92	RCC	Meter	5.00	1400.00	7000.00
93	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
94	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
95	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines. No additional payment shall be admissible against the same.**				
96	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
97	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
98	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
99	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
100	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
101	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
102	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				

SCHEDULE OF RATES (Annexure-C)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Ranchi GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
103	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
104	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
105	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
106	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
107	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
108	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
109	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
110	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
111	20 mm PE 100 pipe/32 mm PE 100 pipe	Meter	5.00	772.80	3864.00
112	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer-in-charge)**				
113	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
114	**GI Sleeves /Concrete Sleeves**				
115	2 $^{1}/_{2}$" NB, 1' Length	NOS	1.00	280.00	280.00
116	4" NB, 1' Length	NOS	1.00	501.00	501.00
117	**Concrete Sleeve (NP-2 Class)**				
118	4" NB, 3' Length	NOS	1.00	278.00	278.00
119	6" NB, 3' Length	NOS	1.00	447.00	447.00
120	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In- Charge / Owner				
121	**Installation of valve(Normal stem) in pit including supply of valves**				
122	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
123	PE Valve 32 mm dia	NOS	2.00	4450.00	8900.00
124	PE Valve 63 mm dia	NOS	1.00	10291.00	10291.00
125	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
126	Type-I having Internal size of Minimum 600 x 600mm	NOS	3.00	31000.00	93000.00
127	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
128	**Fabrication & Installation of Markers**				
129	**RCC Route Markers**				
130	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	40.00	473.00	18920.00
131	**Pole Markers with Foundation**				
132	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	4.00	2631.20	10524.80
133	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
134	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	CUM	1.00	11740.00	11740.00
135	**Excavation of Hard rock/surface**				
136	Excavation of trench or pits, wherever hard rock presence is exceeding 1.5 m in any direction of the trench and excavation of trench or pits in Malba/Multiple layers of asphalt/ brick / PCC/RCC etc and removable only by pneumatic chisel / drill as per the specifications and direction of EIC. The rates are payable over and above the Laying rates as per relevant **SOR Item.**				
137	Cutting of PCC/RCC surface with thickness more than 12" or Continuous asphalt multi-layer/ Malba/ Brick / rock/ Boulders more than 24".(Malba shall be considered as a strata where soil is in mixed form of debris/building rubbish or discarded pieces of bricks/stones)	RM	1.00	126.00	126.00
138	**Additional Backfilling of Sand in excavated trench/Pit as per site requirement**				
139	Filling of M-Sand/Soft soil as per the site requirement and as per the instructions of EIC (except the sand padding as mentioned PE pipelime laying under SL No.2)	CUM	1.00	800.00	800.00
140	**CIVIL WORKS**				
141	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
142	1" TF	NOS	1.00	1072.50	1072.50
143	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
144	20 mm PE 100 MDPE Pipeline	Meter	10.00	212.00	2120.00
145	32 mm PE 100 MDPE Pipeline	Meter	10.00	248.00	2480.00
146	63 mm PE 100 MDPE Pipeline	Meter	10.00	325.00	3250.00
147	90 mm PE 100 MDPE Pipeline	Meter	10.00	343.00	3430.00
148	**TOTAL VALUE (EXCLUDING GST)**				**25,00,000.00**

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Jamshedpur GA (Annexure-D)

GAIL_Internal

SCHEDULE OF RATES (Annexure-D)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Jamshedpur GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	MTR	100.00	300.00	30000.00
28	32 mm PE 100 pipe	MTR	500.00	300.00	150000.00
29	63 mm PE 100 pipe	MTR	100.00	352.50	35250.00
30	90 mm PE 100 pipe	MTR	100.00	442.50	44250.00
31	125 mm PE 100 pipe	MTR	100.00	532.50	53250.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	32 mm PE 100 pipe	MTR	50.00	455.40	22770.00
34	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
35	63 mm PE 100 pipe	MTR	100.00	691.50	69150.00
36	90 mm PE 100 pipe	MTR	300.00	1030.50	309150.00
37	125 mm PE 100 pipe	MTR	850.00	1389.00	1180650.00
38	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
39	90 mm PE 100 pipe	MTR	80.00	1339.65	107172.00
40	125 mm PE 100 pipe	MTR	80.00	1805.70	144456.00
41	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
42	**Restoration**				
43	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
44	Cement Concrete	MTR	80.00	1196.00	95680.00
45	**Installation of valve(Long stem) in pit including supply of valves**				
46	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
47	PE Valve(Long Stem) 90 mm dia	NOS	1.00	15319.00	15319.00
48	PE Valve(Long stem) 125mm dia	NOS	1.00	21968.00	21968.00

GAIL_Internal

SCHEDULE OF RATES (Annexure-D)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Jamshedpur GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
49	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
50	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	1.00	47250.50	47250.50
51	Tvpe I : Inside size minimum 1500 mm x 1000 mm	NOS	1.00	74813.20	74813.20
52	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
53	**Fabrication & Installation of Markers**				
54	**RCC Route Markers**				
55	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	25.00	473.00	11825.00
56	**Pole Markers with Foundation**				
57	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	5.00	2631.20	13156.00
58	**GPR Survey (Scope includes submission of GPR survey report before/after obtaining permission for excavation from land owning agencies with complete satisfaction of the land owning agnency & Owner)**				
59	GPR Survey	RM	500.00	81.00	40500.00
60	**Installation of Service Regulator / Field Regulator: Installation & Fixing of regulator with associated inlet and outlet**				
61	**The scope also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).**				
62	Service Regulator installation - (4/6 bar to 100 mbar)	NOS	1.00	2750.00	2750.00
63	**Regulator Boxes: Supply including painting of approved make regulator boxes and installing them firmly by grouting using approved bracket /clamps as per drawing enclosed & as per specifications and and cleaning the area complete to the satisfaction.**				
64	Service Regulator Boxes: Supply and installation of Service Regulators Boxes as per drawing attached and as per directions of EIC.	NOS	1.00	3300.00	3300.00
65	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
66	63 mm PE 100 MDPE Pipeline	Meter	25.00	325.00	8125.00
67	90 mm PE 100 MDPE Pipeline	Meter	25.00	343.00	8575.00
68	125 mm PE 100 MDPE Pipeline	Meter	21.28	500.00	10640.30
69	**TOTAL VALUE (EXCLUDING GST)**				**25,00,000.00**

GAIL_Internal

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Bhubaneswar GA (Annexure-E)

GAIL_Internal

SCHEDULE OF RATES (Annexure-E)

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	MTR	500.00	300.00	150000.00
28	32 mm PE 100 pipe	MTR	250.00	300.00	75000.00
29	63 mm PE 100 pipe	MTR	20.00	352.50	7050.00
30	90 mm PE 100 pipe	MTR	10.00	442.50	4425.00
31	125 mm PE 100 pipe	MTR	10.00	532.50	5325.00
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	MTR	10.00	455.40	4554.00
34	32 mm PE 100 pipe	MTR	10.00	455.40	4554.00
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	MTR	1200.00	649.50	779400.00
37	63 mm PE 100 pipe	MTR	150.00	691.50	103725.00
38	90 mm PE 100 pipe	MTR	25.00	1030.50	25762.50
39	125 mm PE 100 pipe	MTR	25.00	1389.00	34725.00

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SCHEDULE OF RATES (Annexure-E)

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	MTR	5.00	450.00	2250.00
42	32 mm PE 100 pipe	MTR	5.00	450.00	2250.00
43	63 mm PE 100 pipe	MTR	5.00	747.00	3735.00
44	90 mm PE 100 pipe	MTR	5.00	1258.50	6292.50
45	125 mm PE 100 pipe	MTR	5.00	2109.00	10545.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				
47	20 mm PE 100 pipe	MTR	5.00	546.00	2730.00
48	32 mm PE 100 pipe	MTR	5.00	546.00	2730.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	MTR	5.00	898.50	4492.50
51	63 mm PE 100 pipe	MTR	5.00	1956.00	9780.00
52	90 mm PE 100 pipe	MTR	5.00	2973.00	14865.00
53	125 mm PE 100 pipe	MTR	5.00	4113.00	20565.00
54	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Hard rock)**				
55	20 mm PE 100 pipe	MTR	150.00	390.00	58500.00
56	32 mm PE 100 pipe	MTR	30.00	390.00	11700.00
57	63 mm PE 100 pipe	MTR	10.00	458.25	4582.50
58	90 mm PE 100 pipe	MTR	10.00	575.25	5752.50
59	125 mm PE 100 pipe	MTR	10.00	692.25	6922.50
60	**Pipeline Laying Through Moling(without casing) in unprepared surface (Hard rock)**				
61	20 mm PE 100 pipe	MTR	10.00	592.02	5920.20
62	32 mm PE 100 pipe	MTR	10.00	592.02	5920.20
63	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
64	32 mm PE 100 pipe	MTR	100.00	844.35	84435.00
65	63 mm PE 100 pipe	MTR	25.00	898.95	22473.75
66	90 mm PE 100 pipe	MTR	10.00	1339.65	13396.50
67	125 mm PE 100 pipe	MTR	10.00	1805.70	18057.00
68	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Hard rock)**				
69	20 mm PE 100 pipe	MTR	5.00	585.00	2925.00
70	32 mm PE 100 pipe	MTR	5.00	585.00	2925.00
71	63 mm PE 100 pipe	MTR	5.00	971.10	4855.50
72	90 mm PE 100 pipe	MTR	5.00	1636.05	8180.25
73	125 mm PE 100 pipe	MTR	5.00	2741.70	13708.50
74	**Pipeline Laying Through Moling(with casing) in unprepared surface (Hard rock)**				
75	20 mm PE 100 pipe	MTR	5.00	709.80	3549.00
76	32 mm PE 100 pipe	MTR	5.00	709.80	3549.00
77	**Pipeline Laying Through HDD (with casing) in unprepared surface (Hard rock)**				
78	32 mm PE 100 pipe	MTR	5.00	1168.05	5840.25
79	63 mm PE 100 pipe	MTR	5.00	2542.80	12714.00
80	90 mm PE 100 pipe	MTR	4.00	3864.90	15459.60
81	125 mm PE 100 pipe	MTR	5.00	5346.90	26734.50
82	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
83	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	NOS	60.00	3115.00	186900.00
84	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	NOS	2.00	4615.00	9230.00
85	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid. V) In case quantity increases beyond 4 meter payment towards additional length beyond 4 Mtr shall be paid as per releavant SOR item.				
86	**Restoration**				
87	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
88	Asphalting	MTR	50.00	600.00	30000.00
89	Cement Concrete	MTR	250.00	1196.00	299000.00
90	Tiles / Paver / Blocks / Curb Stones, Red sand stone	MTR	10.00	227.70	2277.00
91	Brick Soling / Channels, etc.	MTR	5.00	248.00	1240.00
92	RCC	MTR	5.00	1400.00	7000.00
93	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
94	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
95	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines**. **No additional payment shall be admissible against the same.**				
96	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
97	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
98	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				

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SCHEDULE OF RATES (Annexure-E)

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
99	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
100	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
101	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
102	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
103	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
104	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
105	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
106	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
107	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
108	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
109	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
110	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
111	20 mm PE 100 pipe/32 mm PE 100 pipe	MTR	10.00	772.80	7728.00
112	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer- in-charge)**				
113	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
114	**GI Sleeves /Concrete Sleeves**				
115	2 $^{1}/_{2}$" NB, 1' Length	NOS	1.00	280.00	280.00
116	4" NB, 1' Length	NOS	1.00	501.00	501.00
117	**Concrete Sleeve (NP-2 Class)**				
118	4" NB, 3' Length	NOS	1.00	278.00	278.00
119	6" NB, 3' Length	NOS	1.00	447.00	447.00
120	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In-Charge / Owner				
121	**Installation of valve(Normal stem) in pit including supply of valves**				
122	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
123	PE Valve 32 mm dia	NOS	1.00	4450.00	4450.00
124	PE Valve 63 mm dia	NOS	1.00	10291.00	10291.00
125	PE Valve 90 mm dia	NOS	1.00	15319.00	15319.00
126	PE Valve 125mm dia	NOS	1.00	21968.00	21968.00
127	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
128	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	1.00	47250.50	47250.50
129	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
130	**Fabrication & Installation of Markers**				
131	**RCC Route Markers**				
132	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	25.00	473.00	11825.00
133	**Pole Markers with Foundation**				
134	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	1.00	2631.20	2631.20
135	**Warning Plate Markers**				
136	Supply, fabrication and installation of plate markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawing in technical volume to be installed near regulator.	NOS	50.00	489.50	24475.00
137	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
138	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	CUM	1.00	11740.00	11740.00
139	**GPR Survey (Scope includes submission of GPR survey report before/after obtaining permission for excavation from land owning agencies with complete satisfaction of the land owning agnency & Owner)**				
140	GPR Survey - Length up to 100 meter	NOS	1.00	8260.00	8260.00
141	GPR Survey - Length more than 100 meter	RM	101.00	81.00	8181.00
142	Note: In case the Ground Penetrating Radar (GPR) survey length exceeds 100 m at any location, payment for the survey length beyond the initial 100 m shall be made in addition to the applicable SOR item, at the per running metre rate derived from the corresponding SOR item.				
143	**Excavation of Hard rock/surface**				

GAIL_Internal

SCHEDULE OF RATES (Annexure-E)

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
144	Excavation of trench or pits, wherever hard rock presence is exceeding 1.5 m in any direction of the trench and excavation of trench or pits in Malba/Multiple layers of asphalt/ brick / PCC/RCC etc and removable only by pneumatic chisel / drill as per the specifications and direction of EIC. The rates are payable over and above the Laying rates as per relevant **SOR Item.**				
145	Cutting of PCC/RCC surface with thickness more than 12" or Continuous asphalt multi-layer/ Malba/ Brick / rock/ Boulders more than 24".(Malba shall be considered as a strata where soil is in mixed form of debris/building rubbish or discarded pieces of bricks/stones)	RM	1.00	126.00	126.00
146	**Additional Backfilling of Sand in excavated trench/Pit as per site requirement**				
147	Filling of M-Sand/Soft soil as per the site requirement and as per the instructions of EIC (except the sand padding as mentioned PE pipelime laying under SL No.2)	CUM	1.00	800.00	800.00
148	**CIVIL WORKS**				
149	**Earth Work** Earth in excavation and filling to the grades and levels shown in the approved drawings in all kinds of conditions including for Road embakments, using approved quality good earth from designated borrow area, for all heights and depths including clearing and stripping (min. 150 mm) of the area marked for filling, taking spot levels, consolidating the exposed natural soil surface, excavating the earth from borrow area loading, transporting & unloading, spreading in layers not exceeding 150 mm thickness, breaking clods, watering (if reqd.), ramming and compacting by manual/ mechanical means to give minimum 92% of modified Proctor's density of earth, testing & dressing including disposal of all unserviceable material all complete as per specifications and directions of Engineer-in-charge. (Rate to include cost of all labour, tools, tackles, equipment, hire chanrges, cost of borrow earth by way of royalties, right of way, cess etc., as applicable with all bye works and sundry works).	CUM	1.00	2312.20	2312.20
150	**PCC 1:2:4** 1 Cement : 2 Coarse sand : 4 stone aggregate 20mm nominal size.	CUM	1.00	3837.90	3837.90
151	**PCC 1:4:8** 1 Cement : 4 Coarse sand : 8 stone aggregate 40mm nominal size.	CUM	1.00	3092.10	3092.10
152	(Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials, shuttering, earthwork in excavation and backfilling using approved earth in all conditions etc. with all bye works and sundry works.)				
153	**Reinforced Cement Concrete**				
154	Providing and laying reinforced cement of grade M-25 with 20mm and down grade crushed stone aggregate in all types of structures like foundations, pedestals, pedestal bases, pipe supports, sleepers, column, equipment foundation, cable trench inlcuding construction joints, bitumen painting on surface in contact with soil, supplying and fixing reinforcing steel, shuttering, inserts, finishes etc. at all depths and heights complete as per drawings, specifications and direction of the Engineer-in-charge.	CUM	1.00	10417.00	10417.00
155	Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all maerials such as minimum 43 grade cement including sulphate resistant cement for sub-structures, R/F steel, Inserts, bolts, conduits, bitumen, other minor constrcution materials, shuttering, stanging, earthwork in excavation and backfilling using serviceable earth in all conditions, shorting bailing and pumping out water, testing of concrete, curing etc. with all bye works and sundry works.				
156	**Structural Works**				
157	**Providing and fixing Fencing Structure**				
158	Supplying, fabricating & fixing GI wire fencing fabricated from GI wire confirming to IS: and GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, including applying two coats of approved quality of synthetic enamel paint over a priming coat of in approved shade including supply of all raw materials, bolts, electrodes, transportation, including making pokets & pouring with PCC (1:2:4) in of block for fixing of posts etc including Y type angle and barbed wire (900 mm) complete as per enclosed drawing, technical specifications, scope of works and directions of the Engineer-In-Charge.				
159	Fencing height 2.1m alongwith barbed wire of height atleast 900 mm on Y type angle.	RM	1.00	2235.20	2235.20
160	**Providing and fixing Fencing Gates**				
161	Supplying, fabricating & fixing fencing gates fabricated from pipes conforming to IS:1161 and plates conforming to IS:2062 & fixing of GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, painting with enamel paint in approved shade including supply of all raw materials, bolts, electrodes, transportation etc complete as per enclosed sketch, technical specifications and directions of the Engineer-In-Charge.				
162	4m Wide x 2.1m High	NOS	1.00	45026.30	45026.30
163	3m Wide x 2.1m High	NOS	1.00	25727.90	25727.90
164	1m Wide x 2.1m High	NOS	1.00	11580.80	11580.80
165	**Preservation of Pipeline**				
166	**Preservation of pipeline sections and associated facilities (in event of delay in comissioning, other unforeseen reasons) including supply of nitrogen, all consumables, all equipment, man-power, etc. complete as per the requirements of specifications, other provisions of Contract document and instructions of Engineer-in-charge.**				
167	**By filling and pressurizing with nitrogen to a pressure of 2 bar(g) for a period of one month or part thereof.**				
168	For 125 mm Pipeline	MTR	3.00	11.70	35.10
169	For 90 mm Pipeline	MTR	3.00	10.14	30.42
170	For 63 mm Pipeline	MTR	3.00	8.58	25.74
171	For 32 mm Pipeline	MTR	3.00	7.02	21.06
172	For 20 mm Pipeline	MTR	3.00	6.24	18.72
173	**For every additional period of one month or part thereof Limited to 6 month**				
174	For 125 mm Pipeline	MTR	3.00	6.24	18.72
175	For 90 mm Pipeline	MTR	3.00	5.46	16.38
176	For 63 mm Pipeline	MTR	4.00	4.68	18.72
177	For 32 mm Pipeline	MTR	4.00	3.60	14.40
178	For 20 mm Pipeline	MTR	4.03	3.12	12.56
179	**Notes:** i) The above length is not for a single section but for no. of sections. ii) All accessrious ie; End caps and two nos tappings of 3/4 inches, PG to be considered per section and rate for the same shall be quoted by bidder under this item. iii) If month is partially complete, payment shall be made on prorata basis. iv) Scope includes pressure holding for a period of 6 months or as per EIC and jointing of PE pipe (if required) due to damage by any means and further filling of nitrogen for pressure holding.				
180	**Liaisoning with Land Owning Agencies for Permission** Submission of applications as per approved drawing provided by owner / owner's representative (Initial Route survey, prepartion of drawing, measuring and providing details of surface type shall be in scope of contractor), obtaining and submission of demand note, coordination, Liaisoning, obtaining written permission from land owing agencies like NHAI, AAI,Indian Railways and any other government agencies who maintains the public lands and agencies owing Private lands etc. (all fee paid to authorities excluding demand charges or Bank Guarantees shall be reimbursed against documentary evidence). This rates are not applicable for Private lands i.e. Apartments etc. Permissions required from various authorities like NHAI / Railways / Irrigation (Canal) etc. falling enroute shall be inclusive in the item rate.	KM	1.00	14910.83	14910.83
181	**Installation of Service Regulator / Field Regulator: Installation & Fixing of regulator with associated inlet and outlet**				
182	**The scope also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).**				
183	Service Regulator installation - (4/6 bar to 100 mbar)	NOS	2.00	2750.00	5500.00
184	**Regulator Boxes: Supply including painting of approved make regulator boxes and installing them firmly by grouting using approved bracket /clamps as per drawing enclosed & as per specifications and and cleaning the area complete to the satisfaction.**				
185	Service Regulator Boxes: Supply and installation of Service Regulators Boxes as per drawing attached and as per directions of EIC.	NOS	1.00	3300.00	3300.00
186	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
187	4" TF	NOS	1.00	16516.50	16516.50
188	2" TF	NOS	1.00	3740.00	3740.00

GAIL_Internal

SCHEDULE OF RATES (Annexure-E)

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Bhubaneswar GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
189	1" TF	NOS	1.00	1072.50	1072.50
190	**Crossing of Sewage Drains/Nala alongside independent houses where drains/Nalas are being encountered adjacent to houses.**				
191	The scope of work includes supply of medium-duty GI casing pipes of 2.5 inches, along with padding with sandstone and civil works associated with the construction of cover slab as per std. drawing.	NOS	5.00	3465.00	17325.00
192	**General Note:** (i) The quantites of individual item can varied as per site requirement.The payment will be made as per actual certified measurement at site. For the supply items the quantities shall be procured after approval from client/ consultant/EIC. (ii) The bidder must indicate currency(ies) against each quoted item of the SOR. (iii) The total amount shall also be given by the bidder in the quoted currency(ies). (iv) Some of the may / may not be execute as per site requirements.				
193	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				
194	20 mm PE 100 MDPE Pipeline	Meter	5.00	212.00	1060.00
195	32 mm PE 100 MDPE Pipeline	Meter	5.00	248.00	1240.00
196	63 mm PE 100 MDPE Pipeline	Meter	5.00	325.00	1625.00
197	90 mm PE 100 MDPE Pipeline	Meter	5.00	343.00	1715.00
198	125 mm PE 100 MDPE Pipeline	Meter	5.00	500.00	2500.00
199	**TOTAL VALUE (EXCLUDING GST)**				**25,00,000.00**

Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Cuttack GA (Annexure-F)

GAIL_Internal

SCHEDULE OF RATES (Annexure-F)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
1	**PE PIPELINE**				
2	**Pipe Laying(including crossing) in any type of surface like unprepared surface (Katcha surface)/ Normal Surface/ Hard surface/Rock surface etc using open cut/ Moling (without Casing)/ Moling (with Casing)/Directional Drilling technique (with and without casing pipe) methodology.**				
3	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of PE100, SDR11 line pipes of all sizes including, proper stacking, identification,and supply of accessories of all sizes & thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 32 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route, laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables, equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store. -Laying of all PE pipe (PE 100 SDR11), Including supply of HDPE casing pipe (in case of HDD (with case).Moling(with case) , Couplers, End caps etc. -Survey of under ground utilities, execution of the work as per specification, including excavation of pits moling with the hole size not exceeding 20% of the pipe dia, jointing and insertion of carrier pipe with casing, testing & commissioning and restoration of the pits to original condition, submission of As-Built Graph as per specifications and the instruction of Engineer-in-charge. -Casing details is as given below:- 1. For 20/32 mm PE pipe (in 75 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 2. For 63 mm PE pipe (in 125 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 3. For 90 mm pipe (in 180 mm dia. HDPE Casing Pipe, PE 63/80 PN6.0). 4. For 125 mm pipe (in 250 mm dia. HDPE Casing Pipe, PE63/80 PN 6.0).				
4	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawings.				
5	Specifications, scope of work indicated in PJS and other provisions of Contract document and instructions of Engineer-in-charge, including but not limited to carrying out the following works:				
6	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details and submit same to Owner for review / approval.				
7	Carrying out preliminary activities such as preperation of drawings wherever required for crossing etc.				
8	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
9	Stacking and installation of construction markers, clearing, fencing, grubbing, cutting of trees, full filling all the requirements of various statutory/ environment authorities to the entire satisfaction of concerned authorities, grading of work area.				
10	Barricading the work area as per local authorities norms & to the satisfaction of Owner/ Eingineer -in- charge, installation of safety signs.				
11	Barricading the pipeline construction area prior to execution of the works as per standard drawing enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				
12	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
13	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
14	Installation / lowering the pipeline in trench to required depth as per PJS, Technical Specification & drawings, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per standard drawings, data sheets & technical specifications, padding around pipeline including supply of suitable padding material duly approved by EIC, backfilling to its original condition with excavated earth / borrowed select soil/sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
15	The scope of work against this item also include Electro-fusion jointing of valves, fittings wherever required and as directed by Engineer-in-charge.				
16	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
17	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
18	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
19	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work).				
20	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/PMC				
21	Preparation and submission of Daily progress report, Laying Graphs / PE line cards on daily basis.				
22	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
23	In case, the minimum required depth is not possible due to site condition, necessary mitigation measures (for minimum top cover of 600mm) shall be required to be taken by contractor in consultation with EIC as per PNGRB Guidelines. No additional payment shall be admissible against the same. However required top cover can further be reduce till 375mm and payment against the same shall be made according to below mwntionwd rate of concreating.				
24	Submission of all documents required for contract closure in numbers as mentioned in contract.				
25	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
26	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
27	20 mm PE 100 pipe	Meter	160.00	300.00	48,000.00
28	32 mm PE 100 pipe	Meter	500.00	300.00	1,50,000.00
29	63 mm PE 100 pipe	Meter	25.00	352.50	8,812.50
30	90 mm PE 100 pipe	Meter	5.00	442.50	2,212.50
31	125 mm PE 100 pipe	Meter	5.00	532.50	2,662.50
32	**Pipeline Laying Through Moling(without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
33	20 mm PE 100 pipe	Meter	10.00	455.40	4,554.00
34	32 mm PE 100 pipe	Meter	10.00	455.40	4,554.00
35	**Pipeline Laying Through HDD (without casing) in unprepared surface (Katcha surface)/ Normal Surface**				
36	32 mm PE 100 pipe	Meter	1,000.00	649.50	6,49,500.00
37	63 mm PE 100 pipe	Meter	150.00	691.50	1,03,725.00
38	90 mm PE 100 pipe	Meter	50.00	1030.50	51,525.00
39	125 mm PE 100 pipe	Meter	50.00	1389.00	69,450.00
40	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Katcha surface)/ Normal Surface**				
41	20 mm PE 100 pipe	Meter	5.00	450.00	2,250.00

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SCHEDULE OF RATES (Annexure-F)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
42	32 mm PE 100 pipe	Meter	5.00	450.00	2,250.00
43	63 mm PE 100 pipe	Meter	5.00	747.00	3,735.00
44	90 mm PE 100 pipe	Meter	5.00	1258.50	6,292.50
45	125 mm PE 100 pipe	Meter	5.00	2109.00	10,545.00
46	**Pipeline Laying Through Moling(with casing) in unprepared surface (Katcha surface)/ Normal Surface**				
47	20 mm PE 100 pipe	Meter	5.00	546.00	2,730.00
48	32 mm PE 100 pipe	Meter	5.00	546.00	2,730.00
49	**Pipeline Laying Through HDD (with casing) in unprepared surface (Katcha surface)/ Normal Surface/Hard Surface**				
50	32 mm PE 100 pipe	Meter	5.00	898.50	4,492.50
51	63 mm PE 100 pipe	Meter	5.00	1956.00	9,780.00
52	90 mm PE 100 pipe	Meter	5.00	2973.00	14,865.00
53	125 mm PE 100 pipe	Meter	5.00	4113.00	20,565.00
54	**Pipeline Laying through Open Cut (Without casing) in unprepared surface (Hard rock)**				
55	20 mm PE 100 pipe	Meter	75.00	390.00	29,250.00
56	32 mm PE 100 pipe	Meter	125.00	390.00	48,750.00
57	63 mm PE 100 pipe	Meter	5.00	458.25	2,291.25
58	90 mm PE 100 pipe	Meter	5.00	575.25	2,876.25
59	125 mm PE 100 pipe	Meter	5.00	692.25	3,461.25
60	**Pipeline Laying Through Moling(without casing) in unprepared surface (Hard rock)**				
61	20 mm PE 100 pipe	Meter	5.00	592.02	2,960.10
62	32 mm PE 100 pipe	Meter	5.00	592.02	2,960.10
63	**Pipeline Laying Through HDD (without casing) in unprepared surface (Hard rock)**				
64	32 mm PE 100 pipe	Meter	100.00	844.35	84,435.00
65	63 mm PE 100 pipe	Meter	25.00	898.95	22,473.75
66	90 mm PE 100 pipe	Meter	5.00	1339.65	6,698.25
67	125 mm PE 100 pipe	Meter	5.00	1805.70	9,028.50
68	**Pipeline Laying through Open Cut(With casing) in unprepared surface (Hard rock)**				
69	20 mm PE 100 pipe	Meter	5.00	585.00	2,925.00
70	32 mm PE 100 pipe	Meter	5.00	585.00	2,925.00
71	63 mm PE 100 pipe	Meter	5.00	971.10	4,855.50
72	90 mm PE 100 pipe	Meter	5.00	1636.05	8,180.25
73	125 mm PE 100 pipe	Meter	5.00	2741.70	13,708.50
74	**Pipeline Laying Through Moling(with casing) in unprepared surface (Hard rock)**				
75	20 mm PE 100 pipe	Meter	5.00	709.80	3,549.00
76	32 mm PE 100 pipe	Meter	5.00	709.80	3,549.00
77	**Pipeline Laying Through HDD (with casing) in unprepared surface (Hard rock)**				
78	32 mm PE 100 pipe	Meter	5.00	1168.05	5,840.25
79	63 mm PE 100 pipe	Meter	5.00	2542.80	12,714.00
80	90 mm PE 100 pipe	Meter	5.00	3864.90	19,324.50
81	125 mm PE 100 pipe	Meter	5.00	5346.90	26,734.50
82	NOTE: i) The lengths of pipelines are tentative. ii) For restoration of asphalt / concrete roads, the item for construction of asphalt top / concrete top / Tiles/Stone slab/Paver Blocks/Curb Stones/RCC Top shall be paid separately as per the rates quoted for the same elsewhere in the SOR. iii) PE laying with casing payment for length of PE pipe will be done as per casing pipe length.				
83	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth upto 1.5 Meter	NOS	25.00	3115.00	77,875.00
84	20 mm PE 100 pipe Service Line Laying upto 4 Meter (Online Ground Connectivity from exisitng Charged line) and depth more than 1.5 Meter	NOS	5.00	4615.00	23,075.00
85	Note: i) The lengths of pipelines are tentative. It may increase or decrease as per site requirement or as per instruction of EIC. II) For restoration of asphalt or concrete roads, the item for construction of asphalt, concrete top, red stone waver, RCC, or JCC shall be paid separately as per the rates quoted for the same elsewhere in the SOR. III) The scope of work will start from tapping saddle/Tee on existing/laid PE pipe of various sizes of existing network to Transition Fitting (PE to GI). The tapping saddle/Tee, Transition fittings, and other fittings shall be included in the measurement under relevant SOR. IV) Bidders have to familiarize themselves with the entire locations/region/charge area within the GA and ascertain all types of eventuality/uncertainty before quoting their bid. V) In case quantity increases beyond 4 meter payment towards additional length beyond 4 Mtr shall be paid as per releavant SOR item.				
86	**Restoration**				
87	Restoration of the roads, pavements, channels, footpaths, tiles, stones etc. to original condition including supply of the approved quality material required, as per local authorities norms, obtaining NOC from concerned local authorities / land owners / third party inspection agencies (if any) designated by owner and to the satisfaction of Engineer-in-charge.				
88	Asphalting	Meter	38.00	600.00	22,800.00
89	Cement Concrete	Meter	400.00	1196.00	4,78,400.00
90	Tiles / Paver / Blocks / Curb Stones, Red sand stone	Meter	25.00	227.70	5,692.50
91	Brick Soling / Channels, etc.	Meter	3.00	248.00	744.00
92	RCC	Meter	5.00	1400.00	7,000.00
93	**Pipe laying inside Private Property i.e Multistory buildings / apartments with no movement of Heavy Vehicles, surrounded with Boundary wall where pipe top cover could not be achieved 600 mm.**				
94	Minimum pipe top cover of 375 mm is required and the line pressure shall not exceed 110mbar.				
95	Necessary mitigation measures such as RCC slab (150mm thick and 300mm width) at the **top**, the RCC slab of the roof of basement shall be treated as bottom. There shall be sand filling across three sides of the line pipe of 100mm each shall be required to be taken by contractor in consultation with EIC as per **latest PNGRB Guidelines**. **No additional payment shall be admissible against the same.**				
96	Receipt, Loading, unloading, storing, reloading, tranportation, unloading, stringing and laying of 20mm, 32mm & 63mm PE pipe (PE 100 SDR11) including proper stacking, identification,and supply of accessories of below mentioned sizes & all thickness like PE Bends, Couplers, Endcaps, Tee, Reducer, CS / GI to PE Fittings (i.e. Transition Fittings of sizes 20 mm to 63 mm), Warning Mat etc. Handling, Stringing / uncoiling, aligning of the PE line pipe on the pipeline Right-of-Use / route , laying / installation of PE line pipe alongwith required accessories as mentioned above as per specification wherever required depending on site condition including execution of all works; Storage of material in contractor's store, fabrication, access for construction procurement and supply of all materials, consumables,equipments, labour and other inputs. In the case of free issue items, the scope also includes, receiving and loading from Owner's designated store, transportation, unloading and stacking of free issue items at Contractor's store.				
97	Carrying out all temporary, ancillary, auxiliary works required to make the PE pipeline ready for commissioning as per drawing.				
98	Surveying of route and detours required at the time of execution, preparation of construction drawings showing survey details, and submit same to Owner for review / approval.				
99	Preparation and getting approval of schedules, execution procedures, drawings/ sketches/ wherever required, making trial pits to determine the underground utilities/ services etc., restoration of the abandoned trial pits to original condition.				
100	Barricading the pipeline construction area prior to execution of the works as per STD drawing no. enclosed with tender document and to the entire satisfaction of owner / engineer- in -charge.				

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SCHEDULE OF RATES (Annexure-F)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
101	Laying using open trench without casing includes survey of under ground utilities (through trial pits), execution of work as per specification including Trenching to all depths by excavation in all types of soils including soft/ rocky strata (Rock Cutting to be paid separately as per SOR no 1.120) and different type of pavement / footpath / roads etc. including rock breaking, chiselling or otherwise cutting etc. as required and storing excavated soil, reusable materials at designated area as directed by Engineer in charge and to a width to accommodate the pipeline as per the relevant standard/ specification etc. [The minimum depth of the top of pipeline shall be 1.0 m measured from top of pipeline to the top of undisturbed surface of the soil or as per Specification/ OISD- 226 & PNGRB latest guidelines whichever is higher]. Dewatering of trenches / pits if required as per site condition. Repairing of all damaged utilities if any, and payment of any compensation (if claimed by owner / other utility agencies)				
102	Uncoiling / stringing & aligning of PE pipes, clamping, jointing of the pipe ends / fittings / valves by qualified personnel using approved electro-fusion techniques as per specification.				
103	Installation / lowering the pipeline in trench to required depth, supply & placement of HDPE Yellow colour warning mat (refer PJS item.- 4.2) over the pipeline along the complete route as per std. drawing and backfilling to its original condition with excavated earth / borrowed select soil / sand duly approved by EIC & its compaction & crowning. At certain specific area of ROU, trench shall be backfilled & compacted and shall be made ready for motorable. All tiles / slabs / curb stones etc removed during excavation shall be placed properly and no seperate payment shall be admissible against this activity. Restoration shall be carried as per separate SOR item mentioned elsewhere in the SOR or to be done by Owner / concerned authorities.				
104	The scope of work against laying of 20/32 mm pipe also includes works like making of PCC pedastal of grade (1:2:4) and size ((300mm(L)X200mm(W) XHeight (H)),(H>=300mm & will be as per site condition)), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).				
105	Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge.				
106	Final clean-up of right-of-use or area disturbed by contractor during their construction activities for laying of pipeline works and disposal of debris and surplus material to designated disposal areas and backfilling of trench and compaction of the same as per satisfaction of Owner and / or as directed by Engineer–in–charge.				
107	Maintaining the completed pipelines and installation for any defect or failures during defect liability period (i.e. 12 months from date of completion of work) .				
108	Handing over the completed works to Owner for their operation/ use, reconciliation of material area wise and obtaining "no objection certificate" from Owner/ Consultant.				
109	On completion of gas charging of pipelines. Preparation and submission of As-built drawings, crossings details, termination, utility graphs and deviation statements.				
110	Any other activities not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of the works shall also be covered under the scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner. All the work shall be executed in accordance with the provision of contract.				
111	20 mm PE 100 pipe/32 mm PE 100 pipe	Meter	10.00	772.80	7,728.00
112	**Supply of GI/ MS/ Concrete Sleeves (wherever required as a Special Case as per instructions of the Engineer-in-charge)**				
113	Supply, installation of sleeve, insertion of pipe, sealing the annuals, firm fixing of Sleeves with concrete mix. Breaking through any obstructions and their subsequent restoration, as per specifications and instructions of the Engineer-in-charge. GI/MS Pipes shall be Heavy (C-Class) as per IS-1239				
114	**GI Sleeves /Concrete Sleeves**				
115	2 $^{1}/_{2}$" NB, 1' Length	NOS	1.00	280.00	280.00
116	4" NB, 1' Length	NOS	1.00	501.00	501.00
117	**Concrete Sleeve (NP-2 Class)**				
118	4" NB, 3' Length	NOS	1.00	278.00	278.00
119	6" NB, 3' Length	NOS	1.00	447.00	447.00
120	**Note:** The decision regarding use of type of sleeves to be used at various locations shall be made by Engineer In- Charge / Owner				
121	**Installation of valve(Normal stem) in pit including supply of valves**				
122	Supply of isolation valves (as per data sheet) and installtion of valves in the valve pits as per typical drawing and specification enclosed and instructions of Engineer-in-charge. Payment of valve pits shall be paid separately as per SOR.				
123	PE Valve 32 mm dia	NOS	1.00	4450.00	4,450.00
124	PE Valve 63 mm dia	NOS	1.00	10291.00	10,291.00
125	PE Valve 90 mm dia	NOS	1.00	15319.00	15,319.00
126	PE Valve 125mm dia	NOS	1.00	21968.00	21,968.00
127	**Construction of Valve Pits as per the enclosed tender drawing and specification. The item includes supply of all the material including Pre-cast RCC cover, shuttering, reinforcement, labour, curing etc as per the drgs, specification and instruction of EIC. (Double rods and Round Manhole)**				
128	Type-I having Internal size of Minimum 600 x 600mm	NOS	1.00	31000.00	31,000.00
129	Type-I having Internal size of Minimum 1000 x 1000mm	NOS	1.00	47250.50	47,250.50
130	**Note:** The tender drawing enclosed is only for reference purpose and contractor shall be required to prepare drawings (in line with reference tender drawing) for specific sizes of Valve pits and the same shall be approved by EIC.				
131	**Fabrication & Installation of Markers**				
132	**RCC Route Markers**				
133	Supply, fabrication and installation of RCC route markers as per the attached drawing in technical volume, along the route including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete.	NOS	25.00	473.00	11,825.00
134	**Pole Markers with Foundation**				
135	Supply, fabrication and installation of plate markers as per the attached drawings in technical volume including all associated civil works such as excavation and construction in all types of soils, construction and pedestals and grouting with concrete, cleaning, stencil let.	NOS	1.00	2631.20	2,631.20
136	**Warning Plate Markers**				
137	Supply, fabrication and installation of plate markers, including application of approved color and quality of primer and paint, stencil letter cutting of lettering, numbers, direction, etc. as per the attached drawing in technical volume to be installed near regulator.	NOS	50.00	489.50	24,475.00
138	**Construction of RCC structure for protection of service line for drain/nallah Crossings**				
139	Construction of Non suspended slabs/pavement slabs including pedestal/ramp etc.using reinforced cement concrete of M-25 grade (Concrete shall be design mix/nominal mix with 20 mm & down size graded crushed stone aggregates) to protect the PE pipe laid. All necessary form work, finishing the top surface rough/smooth as required in any position, shape, level and thickness etc. shall be as specified and directed by EIC. The rates shall include grouting of pockets, supply of all material, tools, reinforcement steel etc.	CUM	1.00	11740.00	11,740.00
140	**GPR Survey (Scope includes submission of GPR survey report before/after obtaining permission for excavation from land owning agencies with complete satisfaction of the land owning agnency & Owner)**				
141	GPR Survey - Length up to 100 meter	NOS	1.00	8260.00	8,260.00
142	GPR Survey - Length more than 100 meter	RM	151.00	81.00	12,231.00
143	Note :-In case GPR survey length exceeds 100m, for quantity beyond 100m, amount in addition to **SOR item no.- A01001**, shall be payable based on per meter rate quoted against **SOR item No. A01002**				
144	**Excavation of Hard rock/surface**				
145	Excavation of trench or pits, wherever hard rock presence is exceeding 1.5 m in any direction of the trench and excavation of trench or pits in Malba/Multiple layers of asphalt/ brick / PCC/RCC etc and removable only by pneumatic chisel / drill as per the specifications and direction of EIC. The rates are payable over and above the Laying rates as per relevant **SOR Item.**				
146	Cutting of PCC/RCC surface with thickness more than 12" or Continuous asphalt multi-layer/ Malba/ Brick / rock/ Boulders more than 24".(Malba shall be considered as a strata where soil is in mixed form of debris/building rubbish or discarded pieces of bricks/stones)	RM	1.00	126.00	126.00
147	**Additional Backfilling of Sand in excavated trench/Pit as per site requirement**				
148	Filling of M-Sand/Soft soil as per the site requirement and as per the instructions of EIC (except the sand padding as mentioned **SOR Item No. A00101**)	CUM	1.00	800.00	800.00
149	**CIVIL WORKS**				

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SCHEDULE OF RATES (Annexure-F)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
150	**Earth Work** Earth in excavation and filling to the grades and levels shown in the approved drawings in all kinds of conditions including for Road embakments, using approved quality good earth from designated borrow area, for all heights and depths including clearing and stripping (min. 150 mm) of the area marked for filling, taking spot levels, consolidating the exposed natural soil surface, excavating the earth from borrow area loading, transporting & unloading, spreading in layers not exceeding 150 mm thickness, breaking clods, watering (if reqd.), ramming and compacting by manual/ mechanical means to give minimum 92% of modified Proctor's density of earth, testing & dressing including disposal of all unserviceable material all complete as per specifications and directions of Engineer-in-charge. (Rate to include cost of all labour, tools, tackles, equipment, hire chanrges, cost of borrow earth by way of royalties, right of way, cess etc., as applicable with all bye works and sundry works).	CUM	1.00	2312.20	2,312.20
151	**PCC 1:2:4** 1 Cement : 2 Coarse sand : 4 stone aggregate 20mm nominal size.	CUM	1.00	3837.90	3,837.90
152	**PCC 1:4:8** 1 Cement : 4 Coarse sand : 8 stone aggregate 40mm nominal size.	CUM	1.00	3092.10	3,092.10
153	(Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials, shuttering, earthwork in excavation and backfilling using approved earth in all conditions etc. with all bye works and sundry works.)				
154	**Reinforced Cement Concrete**				
155	Providing and laying reinforced cement of grade M-25 with 20mm and down grade crushed stone aggregate in all types of structures like foundations, pedestals, pedestal bases, pipe supports, sleepers, column, equipment foundation, cable trench inlcuding construction joints, bitumen painting on surface in contact with soil, supplying and fixing reinforcing steel, shuttering, inserts, finishes etc. at all depths and heights complete as per drawings, specifications and direction of the Engineer-in-charge.	CUM	1.00	10417.00	10,417.00
156	Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all maerials such as minimum 43 grade cement including sulphate resistant cement for sub-structures, R/F steel, Inserts, bolts, conduits, bitumen, other minor constrcution materials, shuttering, stanging, earthwork in excavation and backfilling using serviceable earth in all conditions, shorting bailing and pumping out water, testing of concrete, curing etc. with all bye works and sundry works.				
157	**Structural Works**				
158	**Providing and fixing Fencing Structure**				
159	Supplying, fabricating & fixing GI wire fencing fabricated from GI wire confirming to IS: and GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, including applying two coats of approved quality of synthetic enamel paint over a priming coat of in approved shade including supply of all raw materials, bolts, electrodes, transportation, including making pokets & pouring with PCC (1:2:4) in of block for fixing of posts etc including Y type angle and barbed wire (900 mm) complete as per enclosed drawing, technical specifications, scope of works and directions of the Engineer-In-Charge.				
160	Fencing height 2.1m alongwith barbed wire of height atleast 900 mm on Y type angle.	RM	1.00	2235.20	2,235.20
161	**Providing and fixing Fencing Gates**				
162	Supplying, fabricating & fixing fencing gates fabricated from pipes conforming to IS:1161 and plates conforming to IS:2062 & fixing of GI weldmesh made from 3mm GI wire @ 75 mm bothways to structural steel frame by means of welding/bolting, painting with enamel paint in approved shade including supply of all raw materials, bolts, electrodes, transportation etc complete as per enclosed sketch, technical specifications and directions of the Engineer-In-Charge.				
163	4m Wide x 2.1m High	NOS	1.00	45026.30	45,026.30
164	3m Wide x 2.1m High	NOS	1.00	25727.90	25,727.90
165	1m Wide x 2.1m High	NOS	1.00	11580.80	11,580.80
166	**Preservation of Pipeline**				
167	**Preservation of pipeline sections and associated facilities (in event of delay in comissioning, other unforeseen reasons) including supply of nitrogen, all consumables, all equipment, man-power, etc. complete as per the requirements of specifications, other provisions of Contract document and instructions of Engineer-in-charge.**				
168	**By filling and pressurizing with nitrogen to a pressure of 2 bar(g) for a period of one month or part thereof.**				
169	For 125 mm Pipeline	Meter	5.00	11.70	58.50
170	For 90 mm Pipeline	Meter	4.00	10.14	40.56
171	For 63 mm Pipeline	Meter	4.00	8.58	34.32
172	For 32 mm Pipeline	Meter	4.00	7.02	28.08
173	For 20 mm Pipeline	Meter	4.00	6.24	24.96
174	**For every additional period of one month or part thereof Limited to 6 month**				
175	For 125 mm Pipeline	Meter	5.00	6.24	31.20
176	For 90 mm Pipeline	Meter	5.00	5.46	27.30
177	For 63 mm Pipeline	Meter	5.00	4.68	23.40
178	For 32 mm Pipeline	Meter	5.00	3.60	18.00
179	For 20 mm Pipeline	Meter	6.35	3.12	19.80
180	**Notes:** i) The above length is not for a single section but for no. of sections. ii) All accessrious ie; End caps and two nos tappings of 3/4 inches, PG to be considered per section and rate for the same shall be quoted by bidder under this item. iii) If month is partially complete, payment shall be made on prorata basis. iv) Scope includes pressure holding for a period of 6 months or as per EIC and jointing of PE pipe (if required) due to damage by any means and further filling of nitrogen for pressure holding.				
181	**Liaisoning with Land Owning Agencies for Permission** Submission of applications as per approved drawing provided by owner / owner's representative (Initial Route survey, prepartion of drawing, measuring and providing details of surface type shall be in scope of contractor), obtaining and submission of demand note, coordination, Liaisoning, obtaining written permission from land owing agencies like NHAI, AAI,Indian Railways and any other government agencies who maintains the public lands and agencies owing Private lands etc. (all fee paid to authorities excluding demand charges or Bank Guarantees shall be reimbursed against documentary evidence). This rates are not applicable for Private lands i.e. Apartments etc. Permissions required from various authorities like NHAI / Railways / Irrigation (Canal) etc. falling enroute shall be inclusive in the item rate.	KM	1.00	14910.83	14,910.83
182	**Installation of Service Regulator / Field Regulator: Installation & Fixing of regulator with associated inlet and outlet**				
183	**The scope also includes works like making of PCC pedastal of grade (1:2:4) and size (8"X6"X4"), supply and installation of GI Sleeve (Heavy (C-Class) as per IS-1239), filling of sand and installation of TF (along with supply).**				
184	Service Regulator installation - (4/6 bar to 100 mbar)	NOS	2.00	2750.00	5,500.00
185	**Regulator Boxes: Supply including painting of approved make regulator boxes and installing them firmly by grouting using approved bracket /clamps as per drawing enclosed & as per specifications and and cleaning the area complete to the satisfaction.**				
186	Service Regulator Boxes: Supply and installation of Service Regulators Boxes as per drawing attached and as per directions of EIC.	NOS	2.00	3300.00	6,600.00
187	Supply and Installation of Transition Fittings for Commercial/Industrial connections				
188	4" TF	NOS	1.00	16516.50	16,516.50
189	2" TF	NOS	1.00	3740.00	3,740.00
190	1" TF	NOS	1.00	1072.50	1,072.50
191	**Crossing of Sewage Drains/Nala alongside independent houses where drains/Nalas are being encountered adjacent to houses.**				
192	The scope of work includes supply of medium-duty GI casing pipes of 2.5 inches, along with padding with sandstone and civil works associated with the construction of cover slab as per std. drawing.	NOS	5.00	3465.00	17,325.00
193	**General Note:** (i) The quantites of individual item can varied as per site requirement.The payment will be made as per actual certified measurement at site. For the supply items the quantities shall be procured after approval from client/ consultant/EIC. (ii) The bidder must indicate currency(ies) against each quoted item of the SOR. (iii) The total amount shall also be given by the bidder in the quoted currency(ies). (iv) Some of the may / may not be execute as per site requirements.				
194	**Flushing,Testing & Commissioning of MDPE line with all tools,Machines,Manpower are in contractor scope:Pneumatic testing, purging with nitrogen and commissioning as per specification and approved procedures providing all tools and tackles, nitrogen, instruments, manpower and other related accessories and as per the instructions of the Engineer-in-charge. (Lines already laid)-Note***				

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SCHEDULE OF RATES (Annexure-F)
Schedule of Rates (SOR) for Contract Award Value up to ₹25 Lakh for Cuttack GA

SL NO	ITEM DESCRIPTION	UOM	QTY	RATE	AMOUNT
195	20 mm PE 100 MDPE Pipeline	Meter	5.00	212.00	1,060.00
196	32 mm PE 100 MDPE Pipeline	Meter	4.00	248.00	992.00
197	63 mm PE 100 MDPE Pipeline	Meter	5.00	325.00	1,625.00
198	90 mm PE 100 MDPE Pipeline	Meter	5.00	343.00	1,715.00
199	125 mm PE 100 MDPE Pipeline	Meter	5.00	500.00	2,500.00
200	**TOTAL VALUE (EXCLUDING GST)**				**25,00,000.00**

GAIL (India) Limited

(A Government of India Undertaking)
A Maharatna Company

DETAIL NOTICE FOR HIRING OF CONTRACTORS FOR GAIL'S CGD PROJECT AT SIX GA'S THROUGH WALK-IN METHOD SELECTION PROCESS FOR LAYING OF PE PIPELINE NETWORK INCLUDING ASSOCIATED WORKS

Address: M/s GAIL INDIA LIMITED, Plot No. B, 35-36, Block B, Sector 1, Noida, Uttar Pradesh 201301.

VOLUME – II OF II

Appointed PMC for Contract Award Process on behalf of GAIL (India) Limited

BRIDGE AND ROOF COMPANY (INDIA) LIMITED
(A Govt. of India Enterprise)

Corporate office:
KANKARIA CENTER (4TH & 5TH FLOOR), 2/1 RUSSEL STREET, KOLKATA – 700071, WEST BENGAL (INDIA)

Head Office and Works:
427/1, GRAND TRUNK ROAD, HOWRAH - 711101.

TECHNICAL SPECIFICATIONS

VOL: II OF II

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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C O N T E N T S
LIST OF SPECIFICATION/ STANDARDS VOLUME-II of II

TECHNICAL SPECIFICATION

1) LAYING OF UNDERGROUND PE MAIN PIPELINE

2) INSTALLATION OF ABOVEGROUND GI/Cu PIPING FOR DOMESTIC, COMMERCIAL AND INDUSTRIAL CONSUMERS

3) HDPE PIPES

4) PE FITTINGS AND ELECTRO-FUSION

5) POLYETHYLENE PIPES

6) PE ISOLATION VALVES

7) GI PIPE

8) CU TUBES

9) GI FITTING FOR NATURAL GAS

10) COPPER FITTING

11) BRASS FITTING

12) ISOLATION AND APPLIANCE VALVE

13) WARNING MAT

14) FLEXIBLE METAL HOSE (ANACONDA)

15) FLUX

16) STEEL RE-INFORCED RUBBER HOSE

17) QUALITY ASSURANCE

18) HEALTH SAFETY AND ENVIROMENT

19) DRAWINGS

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TECHNICAL SPECIFICATION

FOR

LAYING OF PE MAIN PIPELINES

AND SERVICE PIPELINES

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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TECHNICAL SPECIFICATION

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

1.2

M/s GAIL (India) Limited has been set up to provide CNG (Compressed Natural Gas) as fuel to commercial & private vehicles through filling stations and PNG (Piped Natu ral Gas) to Industrial,& household for Six GA.

1.2 Nature of Contract

The contractor shall be paid on a Schedule of Rates basis. He shall execute the work and perform his obligations under the contract, and Owner shall pay the contractor for measured quantity of each item of work actually carried out under the contract. Payment shall be at the rate for the work set out in the agreed Schedule of Rates.

2.0 SCOPE OF WORK

Generally the following shall constitute the Contractor's scope of work :

2.1 Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Client / Consultant. Contractor has to submit the Construction/ Execution procedures before commencement of work.

2.2 Assist in obtaining permissions from land owing agencies for road cutting for laying of pipelines. Liaisoning with concerned authorities during execution of the job.

2.3 Prior to start of Construction activities , Contractor shall carry out area and crossings survey and prepare drawings for proposed gas pipe line laying and submit to Owner / Consultant for approval.

2.4 Receipt of free issue items from clients designated stores, loading, transportation, unloading at Contractor's stores near project sites.

2.5 Proper storing, stacking, identification, providing security, and insurance, during storage, laying and upto handing over of pipelines.

2.6 Making trial pits to determine the underground utilities /services such as existing pipelines, Cables (Electrical/Communication), Conduits, U/G drainage, Sewers, tunnels, Subways foundations etc, and deciding optimum routes and depths for laying the pipelines based on the route plans provided in the tender.

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2.7 Obtaining the approval for optimum route and ROU from the concerned authority and EIC. Grading the ROU as per requirement for proper movement of workmen, equipment and QA/QC personnel.

2.8 Wherever required the grass/ turfing, pavement, linings, drains roads and other such 'pucca' area shall be locally removed to facilitate trenching and pipe laying works. The same is to be reinstated as original.

2.9 Supply & Installation of Safety/ Warning Signs, barricading of the entire route to be trenched. Pits to be similarly barricaded along the warning sign.

2.10 To make trenches with stable slopes but restricting minimum disturbance to above ground/underground services/ installation as per specifications and approved route plans; keep the trenches free from water and soil till placement of pipes;

2.11 Uncoiling/ stringing the PE pipes of required sizes (i.e. 20, 32) pipes into trenches as per specification.

2.12 Joining the pipe ends with fittings and valves by approved electro fusion techniques as per specification.

2.13 Installation of pipe fittings/installation like elbow, tee, reducers, tapping saddles, joints, connectors, transition fittings, valves, sleeves etc. including construction of supports, valves pits, inspection chambers etc. as per specification.

2.14 Laying pipeline using trench less technology methods with or without casing pipes as per specification and as directed by EIC.

2.15 Supply & Laying of HDPE duct as casing pipe wherever applicable, along with PE Pipe.

2.16 Supply of good quality GI sleeves, MS enamel coated sleeves, concrete casing pipes, sand and other material, fittings to be supplied by the Contractor as per provisions of tender.

2.17 Back filling and compaction by jumping jack compactor using approved 'good' soil or using excavated earth or borrow earth as per requirement and specification and replacement of tiles, slabs removed during the excavation. Cleaning all unserviceable material, debris, excess earth near trenches etc to designated disposal area.

2.18 Carrying out pneumatic testing and purging as per specifications and approved procedures; providing all tools, tackles, instruments, manpower and other related accessories for carrying out the testing of pipes.

2.19 Nitrogen purging (including supply), commissioning & gas charging of tested pipeline as per approved procedure.

2.20 Restoration of existing ground features such as grass/ turfing, paving, roads, drains, concrete, floral beds, fencing, titles, flooring masonry etc. to original

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condition and to match with adjoining conditions- functionally and aesthetically upto the entire satisfaction of Client/Consultant any other third party agency designated by Client and local authorities, failing which, it will be done at the risk and cost of the contractor. Obtaining satisfactory completion certificates for the restoration work done from the concerned authorities.

2.21 Installing of permanent site markers, warning signs, valve chamber etc.

2.22 Returning surplus material to Clients stores, reconciliation of free issue material/ consumables if supplied by Client and obtaining 'no objection certificates' from Client/ Consultant.

2.23 Handing over the completed works to Client for their operation / use purposes.

2.24 Maintaining the completed pipelines/installation for any defect, failures during defect liability period.

2.25 Preparation and submission of As–built drawings, details of crossings, utility graphs, measurement sheets and deviation statements on completion / commissioning of work by way of drawing, sketches and tables.

2.26 Any other activity not mentioned/ covered explicitly above, but otherwise required for satisfactory completion/ operation/ safety/ statutory/ maintenance of the works shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Client.

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3.0 MATERIAL, LABOUR, PLANT AND EQUIPMENT

3.1 Owner's Scope of Supply (Free Issue Item)

Owner's scope of supply shall be as per PJS clause no 4.1.

In order to speed up the project Free Issue Materials shall be issued to the Contractor from the designated store(s) of Client. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

3.2 Supplied by the Contractor

Contractor will supply all size HDPE casing pipe, GI pipes (as per SOR), fittings and PE fittings other materials as per SOR & scope of supply necessary to complete the laying of gas main pipelines and service pipelines.

The contractor is to procure all bought out items from approved vendors and accordingly keep Client / Consultant informed. The inspection of bought out items would be carried out by Client / Consultant / Third Party Inspection or as instruction by EIC.

In general PE pipe shall be of the following lengths indicated.

20mm/32mm	100 to 300 Mtrs. coils
63 mm	100 Mtrs. Coils
90 mm	50 Mtrs Coils
125 mm	50 Mtrs. Coils
180 mm	12 Mtrs. Coils

The Contractor shall provide the skilled labour, tools, material and equipment necessary for the proper execution of the Work. This will include but not be limited to list of specialized items included in the enclosure furnished herewith.

3.2.1 Equipment & Machinery

All vehicular type machinery shall be in good working order and shall not cause spillage of oil or grease. To avoid damage to paved surfaces the Contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

In addition to above, the contractor must have dedicated bar coded electro- fusion (Automatically readable) machine with power generator (at any point of time minimum 2 nos.), Pipe Cutters (like circular guillotine), End Scrapers, Pipe Straightened, approved Top loading clamp for fusing saddle tapping tee, clamps of all sizes for Electro-fusion fittings, re-rounding tools and test ends

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etc. for pipes of following diameters 125mm, 90mm, 63mm, 32mm & 20mm for this project. Contractor has to arrange his own all equipments for trenchless crossings such as HDD, Moling & rock cutting equipment, HDPE fusion equipment at the site whenever required.

Contractor must also have to arrange his own equipment for restoration work like water tanker and jumping jack compactor for compaction of backfilled trenches and roller and other required equipment/ machinery for asphalting/ road works.

In case there is non availability of approved equipments, tools and tackles during the work at site, suitable penalties, as per special terms and condition of the contract, will be levied and deducted from the running bills.

3.2.2 **Imported Backfill and Material**

The Contractor shall be responsible to arrange the supply of approved soft soil / Coarse Sand free from any impurities like clay,mica and soft flaky pieces as per the instruction of EIC/Owner.

For supply of sand in trench for rocky terrain ,no separate charges are payable and is included in SOR item for excavation of hard rock/Morrum.
Also supply of sand in valve chambers ,Normal chambers & Built up surface ,if required ,as per the instruction of EIC,is not separately payable.

In case specified trench depths are not achieved & if directed by Engineer-in- charge Contractor to provide concrete casing pipes/ slabs or cement concrete, without any cost implication to Owner.

3.2.3 **Other Materials**

The Contractor shall supply the following items where required.

- All materials required for form work, trench support, temporary trench crossings.
- All sign boards, barricades, tin sheets, lights and protective equipment.
- Permanent markers as shown in the drawings enclosed in the tender.
- Material required for installation of valve chambers.
- GI ,Half Round concrete sleeves
- All minor items not expressly mentioned in the Contract but which are necessary for the satisfactory completion and performance of the Work under this Contract.

3.2.4 Manpower

The contractor shall provide the skilled labour, tools, materials, and equipment necessary for the proper execution.

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3.2.5 Acquisition, Receipt, & Storage Of Materials

In case of material supplied by owner than the contractor shall collect all materials from Client store between working hours following all documentation procedures laid down and as directed by EIC. The contractor shall at the time of receipt of material physically examine all materials and notify the EIC immediately of any damage . Any damage not recorded at the time of inspection done by contractor will be deemed not to have existed at the time of receipt of material. Cost of repair, rectification, replacement will be borne by the contractor. Any defective material found during the time of installation will noted and forwarded to stores for replacement immediately with P.O reference and only wit written approval of EIC. The contractor shall ensure that no defective material shall be returned to store at the time of closure of contract. The contractor shall maintain permanent locked store preferably near site in so that all the material are stored in such a manner so as to prevent and damage to the materials from scratching , gouging , indentation , excessive heat or by contact with any sharp objects and chemicals.

The contractor shall maintain log book at their respective stores stating issue and availability of free issue material as a given day. Further the contractor is required to undertake and submit an inventory of materials every month to Owners/Owners Representative (mandatory) .

4.0 PROGRESS OF WORK

The Contractor shall proceed with the Work under the Contract with due expedition and without delay.

The EIC may direct in what order and at what time the various stages or parts of the work under the Contract shall be performed.

Contractor has to regularly submit daily progress reports, weekly progress reports, graphs with utilities, testing reports, material consumption and inventory reports, deviation statements etc.

5.0 APPROVALS

Contractor has to assist in getting permissions, obtain statutory approval/ clearances for laying of pipelines. However, Client will pay the departmental charges and Bank Guarantees for getting the clearances. It is the contractor's responsibility to inform and co-ordinate the concerned local authorities and also other utility agencies before commencement of work at site. To ensure smooth execution of the work on a day to day basis, the contractor has to liaison with respective authorities and obtains necessary approvals.

6.0 REFERENCE SPECIFICATION, CODES AND STANDARDS

The contractor shall carry out the work in accordance with the requirement of latest relevant applicable standards, this specification, Client's Engineering Standards; relevant Oil India Safety Directorate (OISD) norms,

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Latest PNGRB Guidelines, ASME B31.8 – Gas Transmission and Distribution Piping Systems; Australian Standard 3723 – Installation and Maintenance of Plastics Pipe Systems for Gas; and the American Gas Association Document – Purging Principles and Practice. ISO: 4437/ IS:14885 for underground polyethylene pipes and Client's approved procedures

Should the contractor find any discrepancy, ambiguity or conflict in or between any of the Standards and the contract documents, then this should be promptly referred to the Engineer-in-Charge (EIC) for his decision, which shall be considered binding on the contractor.

7.0 SAFETY

The Contractor shall conform to the requirements outlined elsewhere in the tender document. In addition, the Contractor shall observe safe working practices in the storage and handling of cleaning fluids, flammable fluids, etc, and ensure smoking or naked flames are not permitted in the vicinity when these materials are being used.

Trench walls shall be battered with sufficient slope in order to minimize a trench collapse. Where there is a danger of an earth slide or collapse, the trench shall remain open for the minimum time possible with proper barricading. The Contractor is to ensure that no person enters a trench, which is of a depth of 1.5 meters or greater, unless the trench has adequate shoring or the sides are battered to such an extent as to prevent a trench collapse

The Contractor shall also protect all work sites with warning signs, barricades and night lighting. The Contractor shall inspect all fenced excavations daily, and maintain them in good order.

The trenches/ pits shall not be kept open in night times. However in case the same is essential the same shall be properly barricaded with proper lighting arrangements & manned.

The Contractor shall provide all safety equipments like helmets, books, etc. to the labour which are necessary for safe working practice.

Any accident causing injury to any person or damage to property or equipment shall be reported to the EIC.

Where the EIC determines that the work is being performed by the Contractor in an unsafe manner, he may suspend the Work until corrective action is taken by the Contractor.

For further details refer Attached HSE technical specification.

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8.0 ROUTE SURVEY

8.1 Plans detailing the size, operating pressure and approximate location of the proposed mains, connections and associated regulator installations will be issued to the contractor at the start of the works.

8.2 The final alignment of mains will be worked out at site in consultations with the site engineers after route survey and trial pits, at his cost, have been carried out. Any change in routing from the issued drawings due to site constraint will be notified to EIC & his specific written approval shall be obtained before carrying out the job.

8.3 **Service Lines**

8.3.1 A survey will be conducted jointly by Consultant / third party inspection and the contractor at each premises or housing colony to be supplied.The survey record will note customer details, the potential gas supply points and proposed regulator positions and estimates of material quantities. The contractor's representatives will make as sketch of the agreed pipe routes if necessary.

8.3.2 The contractor will be responsible for contacting the customer and making the necessary arrangements for access, and appointments to carry out the work. Contractor shall maintain job card and complaint books at site. Client will not be responsible for any time lost due to broken appointments or disputes with customers.

9.0 ORGANIZATION OF WORK

9.1 All construction work will be carried out as per direction of EIC, and this will be the primary point of contact between the contractor and Client on site. All work will be issued and sanctioned through the EIC and site control exercised by Site Engineer Client/Consultant. The contractor shall ensure that technical quality standards are maintained, that construction is carried out cost effectively and that a good customer and public image of Client is maintained.

9.2 Contractor shall designate RCM who will be the single point coordinator to interact with EIC/Consultant/TPIA and authorized to attend review meetings, receive materials, authorized to sign documents, claims and receive payments etc. . Contractor shall submit the organization chart stating that in charge of projects, store, QA/QC and take approval from the owner.

9.3 The contractor will appoint his own supervisors of minimum number instructed by EIC. These personnel will be responsible to the HSE for monitoring construction standards and for ensuring that all detailed technical requirements are met on each and every job which is undertaken. The contractor's supervisor(s) will have day to day liaison with the SE, and will provide the SE with technical reports and audits, and other management information as is required on work progress and construction quality standards.

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9.4 The contractor's supervisor shall have mobile telephones or pagers to ensure that they can be contacted at all times. The contractor will also nominate one person who can be contacted if necessary out of hours, for the duration of the works. The contractor's supervisor will have access to transport at all times to allow them to visit sites and attend meetings with Consultant / Client as is required. The normal day to day issue of work instructions, communication between Consultant/Client and the contractor's supervisor and the SE. No deviation from the approved technical specification / issued construction drawings shall be undertaken without written approval of EIC.

9.5 Contractor shall maintain a Project site office, Material store with following facilities:

- Telephone, Mobile phones, Fax machine, printers/Scanning/Xerox machines, Computer with e-mail facilty
- 1 No. four wheeler with driver for suit survey , meetings etc, with Owner/Owners representative. Also it shall be well equipped with tools and tackles for attending any emergency complaints and ongoing execution work.

On award of the contract , The contractor shall establish and submit documentary evidence for above Which will be verified by owner before of the work order .Any delay and non-compliance of above may result into the termination of contract

10.0 STRUCTURES, SERVICES AND OTHER PROPERTY

10.1 Location of Underground Utilities

The contractor shall locate all buried utility pipes, underground cables, water mains and other obstructions intersecting or adjacent to the Works, and shall make available the necessary labour to expose and record the depth of cover over all obstructions in advance of excavation. This shall be done far enough in advance of excavation to facilitate gradual change in grade or position found necessary to clear any obstructions.

In addition, the contractor shall excavate trial pits as necessary to determine the pipe route. The number of trial pits will be agreed with the EIC in advance of any excavation. In any event, trial pits shall be made at intervals of a maximum of 30 meters. Restoration of the abandoned trial pits and trenches shall be the contractor's responsibility. No payments shall be made for such type of jobs. It is contractor's responsibility to interact with other utility agencies regarding their existing utilities and finalize the route along with these agencies and Owner/ Owner's.representative.
There will be no additional payments in respect of abandoned trenches incurred because of insufficient or inadequate trial pits, or any associated lost time or delays.

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10.2 **Protection of Structures and Utilities**

The Contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities e.g. Electrical cables, Telephone Cables, Water pipelines, Sewer pipelines etc., and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work. Special care shall be taken while laying Pipelines near the trees.

10.3 **Interference with Traffic, Street Drainage and General Public**

The Work shall be executed in such a manner as to cause a minimum of inconvenience to persons requiring to use public or private roads, lanes, thoroughfares, walkways, rights-of use or passages through which the Works are to be executed. The trench shall be back filled, compacted, leveled and extra earth shall be removed immediately after laying of pipeline to avoid public inconvenience. Closure of roads, etc, shall not be permitted without the approval of the EIC.

The Contractor shall comply with all local Authorities requirements to traffic, and keep roads open to traffic, and maintain access to and within any private property.

Wherever the pipe route crosses driveways, access tracks or entrances to private properties, the Contractor shall give the owner, occupier or relevant authority at least 24 hours prior notice of intended commencement of excavation and shall be restricted to pass through.

The Contractor shall not, in any circumstance, use a private driveway, access track or entrance without the prior approval of the EIC.

The Contractor shall provide suitable access where necessary in the form of temporary bridges, culverts, flumes, etc, of a size and type approved by the EIC.

The Contractor shall comply with all relevant road laws. Where limits and/or speed limits have been placed in the vicinity of the Works, the Contractor shall provide for the necessary movement of plant and equipment in accordance with the requirements of the relevant authority.

The Contractor shall not obstruct any drainage pipes or channels in any road but shall deviate them where necessary and use all proper measures to provide for the free passage of water.

The Contractor shall deliver the completed works after proper cleaning of the site.

The contractor shall conduct his operations at all times, with a view to minimizing as far as practicable noise from plant and other objectionable nuisance (e.g. oil leakage).

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11.0 TRENCHING

The schematic diagram with the detail of trench is enclosed as Annexure.

The Contractor shall perform the excavation works so as to enable the pipe to be laid in conformity with the levels, depths, slopes, curves, dimensions and instructions shown on the Drawings, Specifications or as otherwise directed by the EIC.

Contractor shall excavate and maintain the pipeline trench on staked centerline as per approved alignment sheets taking into account the horizontal curves of the pipelines.

While trenching care shall be taken to ensure that all underground structures and utilities are disturbed to the minimum. Suitable crossing shall be provided and maintained over the ROU wherever necessary to permit general public, property owners or his tenants to cross or move stock or equipment from side of the trench or another.

Trenching shall be made with sufficient slopes on sides in order to minimize collapsing of the trench. On slopes wherever there is danger of landslides, the pipeline trench shall be maintained open only for the time strictly necessary. Client may require excavation by hand tools, local rerouting and limiting the period of executing of the works. Before trench cuts through water table, proper drainage shall be ensured, both near the ditch and ROU in order to guarantee the soil stability.

The Contractor shall ensure that trench bottom is maintained in the square form as far as possible, with equipment, so as to avoid/ minimize the hand grading at the bottom of the trench. The Contractor shall do all such handwork in the trench as required to free the bottom of trench from loose rock, pebbles and to trim protruding roots from the bottom and sidewalls of the trench.

11.1 Depth of Trench

The minimum depth of cover shall be measured from top of pipe to the top of undisturbed surface of the soil or top of the graded working strip or top of road or top of rail, whichever is lower.

The depth of the trench will be such as to provided minimum cover as stipulated below :

* Refer PJS clause No. 17.0 SPECIAL POINTS PERTAINING TO SPECIFICATION.

The minimum depth as mentioned above may be greater than as may be required by Government/ Public authorities under jurisdictions. The Contractor shall perform such work without extra compensation, according to the requirement of concerned authorities.

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In cases of Drain/ Culvert crossing through open cut where excavation cut is more than 1.5m, the extra excavation shall be paid in quantity basis. The rate shall include backfilling as specified. No separate payment is chargeable for extra excavation and includes backfilling as well.

In case the depth could not be achieved due to practical problems and the same is demonstrated, EIC after examining thoroughly and considering the codes and standards may allow the contractor to provide suitable protection by way of concrete casing pipes or slabs without extra cost to Client.

11.2 **Width of Trench**

The width of the trench shall be wide enough to provide bedding around the pipe and to prevent damage to the pipe inside the trench. Unless otherwise directed by the EIC and where ground conditions permit, the minimum distance from the inside edge of the trench wall to the outside of the pipe shall be as per drawing enclosed herewith.

11.3 **Trench Base**

The trench bottom shall be cut or trimmed to provide a uniform bedding for the pipe, and shall be free of stones, metal, wood, vegetation, clods of earth or other debris before placement of the pipe.

Hard rock is defined as trench material with a single piece dimension exceeding 1.5 m in length which cannot be removed other than by the use of pneumatic chisel/drill or sledge hammer and chisel.

Excavation through soil mixed with boulders that have been used for a road base will not be considered as hard rock for the purposes of payment.

1.4 **Clearances**

Unless otherwise approved, the following clearances shall be maintained between the external wall of the gas pipe and the external surface of other underground assets in the vicinity of the Works.

- 150-300 mm where the gas pipe crosses other assets, other than electric cables, whereupon the clearance shall be 300 mm.

- 300mm where the gas pipe is on a similar alignment to the other assets. Where

the above clearances cannot be achieved, or in other special circumstances, the EIC may approve/specify protection with concrete/MS coated pipe, etc. The protective material shall be supplied and installed by the Contractor at his cost.

11.5 **Under Ground Interferences**

The Contractor shall locate and expose manually all underground facilities if any during trenching. Safety barriers, if required shall be erected to prevent any damages or accident. On locations where pipeline is laid under the existing facilities and near the approaches to the crossing, the trench shall be gradually deepened to avoid sharp bends.

All sewers, drains, ditches and other natural waterways encountered while trenching shall be maintained open and functional by providing proper temporary installations if required. Suitable dewatering pumps shall be deployed to dewater, if required.

Whenever it is permitted by Authorities and/ or Client to open cut paved road crossing, or where line is routed within the road pavement, the Contractor shall remove the paving in accordance with the restrictions and requirements of the authorities having jurisdiction thereof as directed by Client. After laying the pipeline, backfilling shall be immediately performed and all the areas connected with the works shall be temporarily restored.

In case of damage to any of above referred structures/ utilities the contractor shall be responsible for repairs/ replacement at his own cost, which shall be carried out to satisfaction of concerned authorities, resident and Consultant / Client.

11.6 **Others**

Throughout the period of execution of such work, the Contractor shall provide and use warning signs, traffic lights or lanterns, barricades, fencing, watchman etc. as required by the local authorities having jurisdiction and/ or Client.

For all roads, paths, walkways etc. that are open-cut, the Contractor shall provided temporary diversions properly constructed to allow the passage of normal traffic with the minimum of inconvenience and interruptions.

The paving shall be restored to its original condition after the pipeline is installed.

The Contractor shall excavate to additional depth at all the points where the contour of the earth may require extra depth, or where as deep trench is required at the approaches to crossings of roadways, railroads, rivers, streams, drainage ditches without any extra cost implication to Client.

The Contractor shall excavate all such aforesaid depths as may be required at no extra cost of Client.

The trench shall be cut to a grade that will provide a firm, uniform and continuous support for the pipe.

The Contractor shall take conducive measures to ensure the protection of underground utilities as per the instructions of Client or relevant authorities.

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Where the pipeline crosses underground utilities/ structures, Contractor shall first manually excavate to a depth and in a such a manner that the utilities/ structures are located, then proceed with the conventional methods.

The locations, where the pipeline has to be laid more or less parallel to an existing pipeline cable and/ or other utilities in the Right-of-way the Contractor shall maintain proper distances and perform the work to the satisfaction of Client and other utility agencies. In such locations, the Contractor shall perform work in such a way that even under the worst weather and flooding conditions, the existing pipeline/ utilities remain stable and shall neither become undermined nor have the tendency to slide towards the trench.

11.7 **Bedding**

The contractor shall ensure that the pipe when placed in the trench is supported and surrounded by a bed of screened excavated soil, which shall be stone free and have a maximum grit size of 5mm in order to ensure no damage occurs to the pipe.

However in case of rocky soil, the bedding shall be done with approved/ good quality packing sand, subject to the approval of the EIC, the size distribution of the sand/ shall be the same as per soil. The packing sand shall be placed to a minimum thickness of 150mm around the pipe in case of rocky terrain.

Unless directed by the EIC the quantity of bedding & surrounding sand shall confirm to specifications. There shall be no void space in packing sand around the pipe.

12.0 LAYING

Laying of PE pipelines shall commence only after ensuring proper dimensions and clean surface of the trench. The trench bottom shall be free from the presence of cuts, stones, roots, debris, stakes, rock projections upto 150mm below underside of pipe and any other material which could lead of perforation/ tearing of the pipe wall. After ensuring above the PE pipe coil shall be uncoiled smoothly through proper equipment's/ care inside the trench ensuring no damage to pipe coil during laying. The Contractor must ensure that pipe caps are provided before lowering of pipeline. The trench after this can be released for back filling leaving adequate lengths open at the ends, for jointing.

Where given specific approval by the EIC a pipe may pass through an open drain or nallah. Where this is permitted the pipe shall be installed inside a concrete or steel sleeve for protection. The sleeve material shall be procured and laid by the Contractor. In general the GI Sleeve and MS sleeves material specification shall be confirming to IS 1239 (Heavy Duty) specification of reputed make. The payment for the length of pipe in the sleeve will be made as per SOR. All other work necessary to break through the walls of the obstruction, and to seal the annulus between the pipe and the sleeve and the sleeve and the wall, shall be deemed to be included in the rates.

Open ends of pipe placed in the trench shall be securely capped or plugged to prevent the ingress of water or other matter. The Contractor is to ensure that

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nothing enters the inside of the pipe during the laying process as this could cause a future blockage or regulator malfunction due to dust, etc.

Service lines shall be installed in accordance with the drawing enclosed. Note that the service pipe rises out of the ground at the customer's premises within a GI sleeve pipe. The vertical portion of the sleeve shall be fixed to the wall of the premises in a secure manner. A bending tool shall be used to bend the GI sleeve pipe so that it has the appropriate curvature and is free of kinks. The bending of the sleeve, its fitting and clamping, and the installation of the transition fitting excluding service-isolating valve, is all included in the service connection rate**.** A rate is included in the SOR for the provision of sleeves for PE laying. Any installation without inspection and approval may lead to penalties as Special condition of contract

A bending tool shall be used to bend the GI sleeve pipe so that it has the appropriate curvature and is free of Kinks. The installation of the GI sleeve for service lines shall be done by sealing the annulus, firm fixing of the GI sleeves with concrete mix, breaking through any obstructions & their subsequent restoration to the satisfaction of the EIC.

The contractor shall supply the GI sleeves (Heavy duty OF IS:1239 reputed make) respectively for domestic & commercial / Industrial installation. The vertical portion of the sleeves shall be fixed to the wall of the premises in a secure manner. The service line shall be installed in accordance with drawing enclosed. The material test certificates / inspection reports shall be inspected by TPIA/PMC before installation.

Valves shall be installed at locations shown on the Design Plan or as directed by the EIC and joined with PE pipes by electro-fusion techniques. The valves shall be supported on a bed of fine fill of grit size not greater than 5mm to achieve equivalent support as the incoming and outgoing pipe work.

Laying graphs with details of depth, length, offsets from fixed references, other utility crossings, fittings, size of casing pipe used for the pipeline shall be prepared on daily basis and submitted to Site Engineers of the Owner for approval. These details will be further incorporated into As-Built Drawings.

14.0 JOINTING OF POLYETHYLENE PIPE

The procedure for jointing of PE pipe and fittings is enclosed. Only Bar coded electro- fusion machine (Automatically Readable) that can read the bar code of the fittings automatically shall be used for jointing of PE pipe / fittings.
Manual feeding electro-fusion machines are not acceptable for jointing purpose.
The Contractor has to submit the certificate of calibration of Fusion machine at the time of start of work and at fixed intervals as per the instruction of owner. Contractor shall ensure that the machine are always available at site, no stoppage of work due to the non availability of machines.
The contractor shall flush the Pipeline with air to remove dust, water, mud etc. before fusing the joints.

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Before jointing, the Contractor shall place packing sand under the pipes on both sides of the joint to keep the pipes in line and at the correct alignment during the jointing process. Alignment clamps with the correct size shells should be used to align the pipe during the electro-fusion cycle.

The Contractor shall ensure that polyethylene pipe is only cut with an approved PE pipe cutting tool. Before fusion is attempted he shall remove the oxidized surface of the pipe to be inserted into the electro-fusion coupling. The tool must remove a layer of 0.1 mm to 0.4 mm from the outer surface of the polyethylene pipe. **It may also be noted that no fusion will be allowed without clamping device and only the approved cutting tools (Hack Saw shall not be allowed for cutting the Pipe) shall be used**.

The contractor has to supply all the consumables required for carrying fusion of the joints (like cloth/ paper napkin, acetone etc.).

If, upon inspection, the EIC determines a joint is defective, Contractor shall remove the joint by an approved method. The cost of this work shall be borne by the Contractor.

For electro-fusion jointing, the contractor must bring own tools, tackles and equipments.

Contractor shall arrange generator for power supply for fusion machine. Taking power connection from electric poles ,connections without written permission from concerned authorities or residential premises is strictly not permitted.

Only, Approved Jointers shall carry out fusion of all joints. Contractors shall provide the list of jointers to be used on the job and make arrangements for qualification Testing of the jointers in presence of Owner / Owner's representative . All approved Jointers shall bear Identity cards signed by Owner/Owner's representative..

Taking power connection from electric poles , connection without written permission from the concerned authorities or residential premises is strictly prohibited

15.0 BACKFILLING

Backfilling shall be done after ensuring that appurtenance have been properly fitted and the pipe is following the ditch profile at the required depth that will provide the required cover and has a bed which is free of extraneous material and which allows the pipe to rest smoothly and evenly. Dewatering shall be carried out prior to backfilling. No backfilling shall be allowed if the trench is not completely dewatered. Prior to backfilling it should be ensured that the post padding where required of compacted thickness 150mm is put over and around the pipe immediately after lowering.

Backfilling shall be carried out immediately after the post padding where required has been completed in the trench, inspected and approved by Client / Consultant, so as to provide a natural anchorage for the pipe, avoiding,

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sliding down of trench sides and pipe moment in the trench. If immediate backfilling is not possible, a padding of at least 200mm of earth, free of rock and hard lumps shall be placed over and around the pipe and coating.

The backfill material shall contain no extraneous material and/ or hard lumps of soil, which could damage the pipe and/ or coating or leave voids in the backfilled trench. In case, it is required and directed by EIC, screening of the backfill material shall be carried out with specified equipment before backfilling the trench.

The surplus material shall be neatly crowned directly over the trench and the adjacent excavated areas on both sides of the trench to such a height which will, in Client / Consultant opinion of provide adequately for future settlement of the trench backfill during the maintenance period and thereafter. The down shall be high enough to prevent the formation of the depression in the soil when backfill has settled into its permanent position should depression occur after backfill, Contractor shall be responsible for remedial work at no extra cost to Company. Surplus material, including rock, left from this operation shall be disposed off to the satisfaction of land owner or authority having jurisdiction at no extra cost to Client.

Where small pieces of rock, gravel, lumps of hard soil or like materials are encountered at the time of trench excavation, sufficient earth or select backfill materials shall be placed around and over the pipe to form a protective cushion extending at least to a height of 150mm above the top of the pipe. Select backfill materials for padding that are acceptable shall be screened soil, containing no gravel. All these works shall be carried out by Contractor at no extra cost to Client. Loose rock may be returned to the trench after the required selected backfill material has been placed, provided the rock placed in the ditch will not interfere with the use of the land by landowner, or tenant.

In case where hard rock is encountered or as desired by EIC sand padding is to be provided upto height of 150mm around the pipe.

When the trench has been dug through drive ways or roads, all backfilling shall be executed with suitable material in layers as approved by Consultant / Client and shall be thoroughly compacted. Special compaction methods as specified may be adopted. All costs incurred there upon shall be borne by the Contractor.

Trenches excavated in dikes which are the properties of railways or which are parts of main roads shall be graded and backfilled in their original profile and condition. If necessary, new and/ or special backfill materials shall be supplied and worked-upto.

PE Warning Grid/Mat 1mm thick and 300mm wide will be placed on distribution main and on service lines inside premises, after backfill of the trench upto a height of 300mm on the top of the carrier pipes. The warning grid is to be unrolled centrally over the pipe section and thereafter further backfilling will commence.

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Backfilling activity shall include proper compaction by jumping jack compactor and watering in layers of 150mm above the warning mat. Proper crowning of not more than 150mm shall be done. All the excavated material required to be used during the Restoration process shall be stacked and kept separately and properly. Wherever Road cutting/ Tiles removal/ PCC cutting has been done during excavation for laying, the area shall be back filled and compacted immediately so that no inconvenience is caused to the general public.

Electro-fusion of joints is to be undertaken immediately after lowering and the activity shall not be kept pending for lack of Electro-fusion jointing. The backfilling shall be considered complete only after the joint in completed.

Debris and other surplus material shall be removed immediately after the back filling.

The contractor shall not be entitled for 30% payment on laying & backfilling till the above activities are completed.

16.0 MOLING:

The Moling shall be carried out as per the requirement specified by Client / Consultant, and approved procedures. The contractor has to carry out thorough survey of the under ground utilities before going for the Moling, to avoid the damage to the other utilities.

No extra payment will be made for any trial/ abandoned pits made during the survey. The supply of all equipment, power required for carrying out moling work, is in contractor's scope. The type of moling to be carried out i.e., Manual/ Machine with or without casing shall be at the discretion of Consultant / Client. A prior approval is to be taken before starting the Moling.

For manual Moling the contractor shall ensure that the size of the hole shall not be more than 20% of the size of the casing / carrier pipe whichever is applicable. After completion of Manual Moling the hole shall be properly compacted / filled with soil by watering and by approved procedures, the pits shall be backfilled, compacted & restored . The rate for such crossing work by using casing pipe & carrier pipe or only carrier pipe shall be payable as per Schedule of Rates. **No separate payment shall be made for pulling the carrier pipe.**

The rates for Moling, as indicated in SOR, are payable as per the size of the casing/ carrier pipe and are inclusive of excavation of pits, backfilling, compaction, restoration, jointing and insertion of carrier pie.

Any damages occurred to other utilities during the Moling operation shall be immediately notified and rectified by the contractor without any cost implication to Client.

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The length of the Hole (excluding the sizes of the pits on both ends) shall be considered for the measurement of Moling length. However, intermediate pits will consider in the moling length.

17.0 BORING/RAMMING/DIRECTIONAL DRILLING

One of the above techniques is required to be carried out by the Contractor where conventional trenching/Moling is not possible viz. railways, major waterways, highways, roads etc. Details of such crossings shall be obtained by the Contractor, and construction drawings shall be prepared by the Contractor in consultation with Consultant / Client. Execution of the work shall be based on the Consultant / Clients approved drawings. The contractor has do the thorough survey of the under ground utilities before commencement of BORING/ RAMMING/ DIRECTIONAL DRILLING to avoid the damage to the other utilities. No extra payment will be made for any trail/ abandoned pits made during the survey. The supply of all equipments is in Contractors scope. Work to be carried out in accordance with API - 1102.

Once the work is allotted, **Any delay in mobilizing / non – availability of HDD machines as per site requirement and conditions shall result in levying of penalties on daily basis as per SCC.**

The type of HDD to be carried out i.e. conventional (with or without casing) shall be at the discretion of Client / Consultant. And prior approval is to be taken before starting the HDD.

The rates for HDD, as indicated in SOR, are payable as per the size of the carrier pipe and are inclusive of excavation of pits, backfilling, compaction, jointing and insertion of carrier pipe and restoration of pits. For HDD with casing pipe no separate payment shall be made for pulling of the carrier pipe, the rate quoted by the Contractor shall be inclusive of pulling carrier pipe.

Any damages occurred to other utilities during the HDD operation shall be immediately notified and rectified by the Contractor without any cost implications to Client.

The length of the HOLE (excluding the sizes of the pits on both ends) shall be considered of HDD length.

18.0 CASING PIPE

The tentative sizes of the HDPE casing pipe for Moling/ HDD shall be as follows:-

Size of PE pipe	Size of HDPE pipe
20 mm	75mm
32 mm	75 mm
63 mm	125 mm
90mm	180mm
125mm	250mm

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19.0 RESTORATION

Wherever the restoration is required, the roads, footpaths (including roads and footpaths inside colonies) shall be restored to original condition, and the same shall be done as per concerned local authorities norms and to the satisfaction of the concerned local Authority. To retard curing of the installed concrete, wet sack cloth is to be placed on the finished surface and kept damp for a period of 36 hours.

Where slabs and blocks are to be restored, the level of the compacted sub- base is to be adjusted according to the slab/block thickness. The slabs or blocks should be laid on moist bedding material, which should be graded sand, mortar or mortar mix. The slabs or blocks should be tapped into position to ensure they do not rock after laying.

The restored slabs or blocks should match the surrounding surface levels. Joint widths should match the existing conditions, and be filled with a dry or wet mix of mortar.

The sketch for restoration of Road, Footpath, Channel is enclosed herewith and is indicative. However, the restoration shall be done in accordance with the norms of concerned land owning agencies.

Turf shall be replaced in highly developed grassed area. In lesser-developed grassed areas topsoil should be replaced during the restoration process.

Where permanent surface restorations cannot be completed immediately, the Contractor shall provide and maintain a suitable temporary running surface for vehicular traffic and pedestrians. The Contractor will be responsible for the maintenance of all restoration carried out, for the duration of the Contract guarantee period.

The Contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose and properly compacted. Where the required standards are not achieved the Contractor will be required to replace the defective restoration work.

Note that Payment for pipe laying will only be authorized on initial-satisfactory restoration, and where the sites has been cleared of all surplus materials, etc.

Contractor has to obtain the clearance certificate from the concerned local authorities after completion of the restoration work. The restoration specification specified in the tender is only a typical specification and the contractor has to carry out restoration as per latest version of the (PWD/ IRC) specification to its original condition and also to the entire satisfaction of land owner (Private/Public).

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The expenditure incurred towards testing of the material used for restoration as per applicable standards, shall be born by the contractor.

20.0 TESTING

Pressure testing will be carried out with compressed air. Compressed air will be provided by Contractor for testing purposes and is to be included in the rates.

For main pipelines work the Contractor shall perform progressive pressure testing to avoid having to find leaks in long lengths of pipe. The test pressure shall be 6.0 bar(g), and there shall be no unaccountable pressure loss during the test period.

Test procedure with sketches showing the pipeline to be tested, vent points, gauge location, and inlet pressure print is to prepared & got approved by EIC.

For main line the test duration shall be 24 hrs . With these tests the pressure should be allowed to stabilize for a period of 30 minutes after pressurization. The holding period may then commence and continue for 24 hours. Measuring instruments shall have been calibrated and their accuracy and sensitivity confirmed. For testing of Network, calibrated pressure gauges of suitable range shall be supplied by the contractor. The pressure gauges shall be calibrated from time to time as desired by Engineer-in-Charge. All testing shall be witnessed and approved by the EIC or his delegated representative. Tie-in joints may be tested at working pressure following commissioning.

For service lines in some cases testing will be carried out independently of the testing of the mains for which the test duration may be reduced to 4 hrs. The service testing in this case will be performed after the service installation is complete but before the service tee has been tapped. Also in some cases the tapping of the service tee will be delayed pending the completion and purging of the main pipelines.

21.0 PURGING

Purging shall be carried out in accordance with the principles defined in the American Gas Association publication 'Purging Principles and Practice".

Nitrogen required for purging will also be provided by the Contractor. Nitrogen shall be supplied in labeled, tested and certified cylinders, and completed with all necessary regulators, hoses and connections, which will be in good condition and working order.

In addition the Contractor shall submit and get approved a Purging Plan before commencing any purging work. The Plan shall include, but not be limited to, the provision of the following materials and equipment: Personal safety equipment, Fire extinguisher, Purging adapter, Purge stack with flame trap and gas sampling point, Gas sampling equipment (may be gas leak detector), squash-off tool, Polyethylene connecting pipe work.

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The Plan shall also include the purging process along with detail on the sequence of events. The process is to also specifically mention the need to lay a wet cloth over the PE main and in contact with the ground, to disperse static electricity during the purging work.

A purge stack with flame trap shall be used when purging services. Care shall be taken to ensure that the purge outlet is so located that vent gas cannot drift into buildings.

22.0 VALVE PIT

The valve pit shall be constructed in accordance with enclosed drawing & payment shall be as per relevant SOR item.

The construction of valve chambers shall be taken up immediately after installation of valve pit.

22.1 Workmanship

The excavation work shall be done at a location given by Engineer–in-Charge. All care shall be taken not to damage existing facilities and surface of construction shall be restored to its original state.

Sandbags to be placed below pipeline without disturbing the layed pipe. Gunny bags and Sand should be of approved quality.

Precast RC slab shall be placed as indicated in the drawing issued to the contractor. PCC to be placed below the pipe as indicated. Once PCC is set sand is to be filled and properly rammed so that pipe and precast concrete blocks are firmly placed.

Valve will be supplied without the operating stem. Contractor has to supply the operating stem with a handle for the valves of the different sizes. The Contractor has to take prior approval for design and material specification of the stem for installation. Approved quality sand is to be placed in between area.

Surrounding area to be properly cleared and PCC to be placed around the location where precast slab with CI Manhole cover is placed. The RC precast slab to be laid in level and finished smooth.

23.0 PERMANENT MARKERS

23.1 Permanent Marker (As per typical Drawings Placed at Tender) shall be installed on the ROU at regular intervals as per the instructions of the EIC immediately after laying of the pipeline. The installation of the type of the Permanent Marker shall be decided by the EIC depending on the site condition. The Markers shall be painted before installation as per the approved procedure. The supply of the paint and painting as per the specification is in contractor's scope. Separate payment for installation of the markers shall be paid to the Contractor as per the respective Item in SOR .

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23.2 The artwork shown in the drawing is typical for all the markers. The contractor must take prior approval for the artwork from EIC before installation of Markers. The artwork must have Client's logo and specify the location of the pipeline from the marker.

Guidelines :

- The installation of these markers shall be such that in between two pole markers two RCC markers are installed with spacing of 50 Mtrs on either side. However , Pole markers shall be installed at all the tapping / Branching points in the mainline.
- Interval between any two RCC markers for mainline (125mm to 63mm) shall not be more than 50 m .
- Pole marker or RCC marker shall be installed near to valve chambers on mainline & inside the pockets respectively for indication.
- Pole marker with foundation shall be installed after two RCC marker as per drawings.
- The entry and exit pits for laying of pipeline by HDD/ Moiling for road crossings shall be marked by pole markers or RCC markers depending upon the site condition .
- In addition to the above , pole markers with foundation (As per drawings) shall be installed outside societies / Areas as per the instruction of the site in charge.
- For the distribution network 32 mm & 20 mm pipe , plate markers shall be installed as per the site condition and direction of the site in charge.

24.0 ASSISTANCE IN COMMISSIONING

Contractor shall provide the required personnel, Vehicles, labour, supervision, tools, equipment, instruments and technical assistance for performance tests and commissioning activities as per requirement of Client / Consultant.

25.0 STANDARD OF WORK

25.1 All work carried out under this contract shall be to standards, codes of practice, construction procedures and other technical requirements as defined in the technical specifications.

25.2 The manpower deployed on the respective work shall be adequately trained & shall have necessary skills to executive / supervise the work. However, the assessment on the qualification of the personal shall be at the discretion of EIC.

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25.3 Fusion operators and other skilled personnel shall be approved by Client / Consultant and identification cards duly signed by EIC shall be issued to them. Only those personnel who are approved by EIC shall be allowed to execute the critical activities like joining of PE Pipes.

26.0 RECORDING (AS-BUILT DRAWINGS)

The Contractor will be required to submit computerized as-built drawings duly certified by EIC in A0/ A1 sheet form at 1:200 scale with six sets of prints plus soft copy. The as-built drawing shall be submitted on area wise as specified. The bill of materials used for the particular area shall be specified on the drawings. The Contractor shall use the area and crossing survey drawings prepared by them as reference. On-site sketches, picking up key reference points, shall be made during the installation of services. The lengths, depths of installed pipe work, changes in direction, major fittings, etc, shall be recorded together with appropriate references to other services crossed and in the proximity of the gas pipe .

Distance of pipeline from permanent property /structure should be provided at least every 20 meters. If there is any chance in alignment/orientation and offset distance etc. of the pipeline in between the above said 20 meters, the same shall be dearly mentioned in the as laid.
Gas objects (off valve, tees, elbows, couplers , T.F, etc shall be shown as block objects (which from a single node to connect) with respect owners symbol and legend. The as laid drawing shall be as per the legends provided by EIC. Details & offset distances from other utilities present should be given in as laid drawing. If there is any change in the depth of pipeline , the same shall be clearly marked with details in the as laid drawings. The details of additional protection provided must be mentioned.

Details of the PE stop off valve and other fittings used should be shown with adequate information and orientation. Technical deviation (if any) should be provided with reference to the buildings and permanent structure around , and the same should be cited clearly with all relevant details.
Complete details of nallah crossings should be shown in a separate sketch.

Name of roads , major landmarks and buildings should be mentioned appropriately for reference.

Proper Chainage shall be mentioned on all the drawings to be referred with continuation reference.

Direction of gas flow should be indicated in each drawing.

Land based features shown on the drawing shall match the exact distance as they were on real ground with respect to scale ratio (1:200)

The details shall be prepared in standard format using Map Info/AUTOCAD Map and submitted in CD ROM. Contractor shall also make the item wise material consumption report for the respective areas in a soft copy and to be submitted along with the as-built drawings.

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27.0 Civil Works

The contractor has to supply the adequate materials and skilled manpower for the completion of all the civil works . The contractors shall also insure that the work carried out as per the detail mentioned in the schedule of rates .

Special care should be taken at the time of labours working in depths/lifting of the skids by hydras/ cranes considering all the safety guidelines.

The contractors has to ensure that sample of all the material shall be inspected and approved by EIC before carrying out installation or erection work. The contractor has to submit the test certificates for all the materials to be used at the site . the construction shall be carried out strictly as per the drawings provided by the Client. The party shall ensure extra / Surplus / malba shall be immediately removed from the site after completion of the job. Separate payment shall be made as per the SOR.

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TECHNICAL SPECIFICATION

FOR

INSTALLATION OF ABOVE GROUND GI /CU PIPING

FOR

DOMESTIC, COMMERCIAL AND INDUSTRIAL CONSUMERS

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
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1.0 GENERAL INFORMATION

1.1 INTRODUCTION

The main intent of the specification is Supply and installation of above ground GI pipes, fittings, valves, meters and regulators, from the outlet of 'PE/GI transition fitting' up to the DOMESTIC consumers 'Appliance / stove/ oven valve' as per the Distribution Schedule.

The scope for commercial consumer includes installation of above ground GI pipes and associated fittings, valves, regulator up to and including meter. However, the piping may have to be carried out up to appliance valve, in case of some commercial customers.

In case of large commercials and industries completely assembled metering skids would be supplied to the contractor who would be required to install and provide inlet & outlet connection.

This technical specification defines the basic guidelines to develop an acceptable design and suitable construction methodology for carrying out different activities listed out in the schedule of rates of this tender.

Compliance with these specifications and / or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

2.0 SCOPE OF WORK

Generally the following shall constitute the contractor's scope of work:

2.1 Plan and prepare a detailed execution schedule and procedure for implementation based on QA / QC formats plans issued by Client / Consultant.

2.2 Contractor has to submit the Construction/Execution procedures before commencement of work to owner / owner's representative for approval.

2.3 Selection of route and marking on walls / floors between 'transition fitting' to 'cooking oven / stove / appliance' making openings and making provisions for fixing clamps. Making temporary but stable platforms / scaffolding / rope ladder etc., required for installation of pipes /fittings at all heights /multi storied flats and locations. Providing safety equipment to workers / plumbers.

2.4 Receipt of regulators, domestic meters, as a free issue items from Owner's Stores, loading, transportation, unloading at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approvals for optimum route and permission for work from the concerned authority and EIC.

2.5 Contractor shall procure all material, except free issue material from the outlet of PE/GI transition fitting up to the Domestic/Commercial customers "Appliance/Stove/Oven valve for satisfactory completion to the wner/Owner's representative.

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2.6 Installation of GI pipes of ½", ¾", 1" dia. between transition fittings (installed by PE contractor) and customer's kitchen which would include NPT threading of pipes, and jointing o f fittings such as elbows, tees, connectors, regulators, meters, isolation valves etc., as per laid procedures and specification including supply of GI fittings & Teflon tapes for sealing of joints. Painting of GI Pipes & fittings as per specification.

2.7 Installation of Copper pipes of ½" (12 mm) OD from the downstream of Meter upto the isolation valve prior to the customers appliance, including the installation of isolation valves, brass fitting at the downstream of meters and at the entry of isolation valves with application of lacquer paint etc. to the satisfaction of EIC.

2.8 Supply & Installation of clamps for fixing pipes, isolation valve, appliance valve, box for regulator, Sleeves wherever required, painting of steel pipes & fittings. Providing consumables grout material, repair / restoration of walls / floors / holes including the materials required for conversions along with tools and tackles etc., complete as per specification.

2.9 Conversion of all types of LPG kitchen appliances to NG based appliances inclusive of supply of nozzles. Signing of Joint Meter Records (JMRs).

2.10 To demonstrate to the customer regarding use, safety and maintenance related aspects of NG based appliances and installations.

2.11 Testing & Commissioning o f installations including purging as per specification and handling over the installation of Client / customer to the entire satisfaction of Client / Consultant.

2.12 Dismantling of scaffolding / temporary structures and cleaning of site.

2.13 Restoration of walls, flooring and other damages while executing the above ground installation

.

2.14 Preparation and submission of above ground installation card for each house / commercial establishment indicating the list of materials used, reasons of not providing connections, testing pressure and date etc.. Deviation statements, if any, on completion / commissioning of work.

2.15 Any other activity not mentioned / covered explicitly above, but otherwise required for satisfactory completion / operation / safety / statutory/ maintenance of the works shall al so b e covered under t he Scope o f work and has to be completed by the Contractor within specified schedule at no extra cost to Client.

2.16 Following activities are also in contractor scope

- Receive customer's request and complaints logged
- Carry out joint technical feasibility survey for request received.
- Attend and resolve customer complaint

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3.0 MATERIAL, LABOUR, PLANT AND EQUIPMENT

3.1 Owner's Scope of Supply (Free Issue Item)

In order to speed up the project Free Issue Materials shall be issued to the Contractor from the designated store(s) of Client. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

3.2 Supplied by the Contractor

The contractor has to supply all GI pipes, GI Fittings, flexible hose, suraksha hose, Valves, Fittings, Clamps, Cu pipes, GI Pipes, Appliance Valves ½" and isolation Valves ½" , ¾", sleeves, etc. and other materials required for said works.

The contractor shall provide the labour, tools (such as Hammer Drill, Piston Drill, Pipe cutters, Dies for threading, Pipe wrenches, spanners, all types of clamps, Plant and equipment necessary for the proper execution of the work. This will include but not be limited to list of specialized tools & tackles enclosed herewith. Contractor shall submit the specification of all the material to be supplied by him to EIC for approval and get the material checked & approved by him before commencement of execution.

The contractor is to be procure all bought out items from approved vendors and accordingly keep Client / Consultant informed. The inspection o f bought out items would be carried out by Client / Consultant / Third Party Inspection or as instruction by EIC.

3.2.1 Plant and Equipment

All vehicular type machinery shall be in good working order and shall not cause spillage of oil or grease. To avoid damage to paved surfaces the contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

3.2.2 Sealant, grout

The contractor shall be responsible to arrange the supply of any consumable sealant or ready mix grout material required for execution o f work. The sealant / grout supplied by the contractor shall be compatible with the area to be restored / rectified. No separate payment for the supply of sealant and grout shall be made to the contractor.

3.2.3 Clamps, Rawal Plugs, Screws, Nozzles etc.

The Clamps, Rawal Plugs, Screws, Nozzles, etc shall be approved lot wise by EIC prior to installation. Re-drilling of existing appliance nozzles is strictly not permitted.

The indicative sketch of the Brackets for Meter and GI Pipe Clamps is enclosed herewith.

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3.2.4 Consumable Items

Special consumables such as Teflon Tapes, Solder wire, Flux, lacquer, thinner, shall be supplied by the contractor and are included for within the rates.

These consumables shall be of reputed companies and required grades / class and duly approved by EIC.

3.2.5. Other Materials

The contractor shall supply the following items where required. All materials required for formwork, NPT threading, testing etc. All signs, barricades, lights and protective equipment.
All material required for working at higher floor levels (i.e., scaffolding, Ladder, safety belts etc.).
Special consumablesuch as grease for maintenance of domestic appliances and all paints or painting of G.I pipes, clamps, sleeves, brackets for meters, consumables such as Teflon Tapes, Petrol, diesel, fuels and oils required are to be supplied by the contractor and are included for within the rates.
All minor items not expressly mentioned in the contract but which are necessary for the satisfactory completion and performance of the work under this contract.

4. Acquisition, Receipt, & Storage Of Materials

In case of materials supplied by owner, than the contractor shall collect all materials from Client store between working hours following all documentation procedures laid down and as directed by EIC. The contractor shall at the time of receipt of material physically examine all materials and notify the EIC immediately of any damage . Any damage not recorded at the time of inspection done by contractor will be deemed not t o have existed at the time of receipt of material . Cost of repair , rectification , replacement will be borne by the contractor. Any defective material found during the time of installation will noted and forwarded to stores for replacement immediately with P.O reference and only with written approval of EIC. The contractor shall ensure that no defective material shall be returned to store at the time of closure of contract .

The contractor shall maintain permanent locked store preferably near site in so that all the material are stored in such a manner so as to prevent and damage to the materials from scratching , gouging , indentation , excessive heat or by contact with any sharp objects and chemicals.

The contractor shall maintain log book at their respective stores stating issue and availability of free issue material as a given day. Further the contractor is required to undertake and submit an inventory of materials every month to Owners/Owners Representative (mandatory) .

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5.0 ISSUE OF WORK INSTRUCTIONS

5.1 The contractor will be required to carry out GI installation in the areas where PElaying is under progress. However, testing of GI installation shall be done in con-junction with laying of PE Service Lines to respective premises. A general scheme of distribution to domestic consumer is indicated in the sketch enclosed herewith, for reference. It may vary in case of individual and multistoried flats. A general scheme of distribution to small commercials consumers is indicated in the sketch enclosed herewith for reference.

5.2 All skilled personnel like plumbers, conversion technicians shall be approved andcertified by EIC. Those who are certified and possess the identify cards duly signed by EIC shall only be authorized to take up respective jobs. The contractor has to arrange the identify cards. **In case it is found that contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per contract**.

5.3 The rates to be quoted by contractor shall be inclusive of all preparatory / bye works,platforms, materials, labour, skills , supervision, tools , taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.

5.4 The schedule of items of SOR have been described in brief and shall be held to be complete in all respect including safety requirements as per clause 9.0, tests, inspection, QA/ QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works whatsoever shall be considered in execution of these items.

5.5 A general scheme of distribution to domestic consumer is indicated in encloseddrawing .It may vary in case of individual and multistoried flats.

6.0 PROGRESS OF WORK

6.1 The contractor shall proceed with the work under the contract with due expedition and without delay.

6.2 The EIC may direct in what order and at what time the various stages or parts of the work under the contract shall be performed.

6.3 Weekly progress reports shall be submitted in the formats approved by Consultant/ Client. , indicating broadly the laying, testing, RFC, conversions and extra piping.

6.4 Material consumption statement to be submitted at least once a month.

7.0 WORK SHEETS

7.1 The quantities and other details will be checked by Consultant / Client's site engineer and the same shall be incorporated in measurement cards, signed & dated as certified on site. The cards will then be approved by the EIC.

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7.2 Measurement sheets shall be prepared based on the measurement cards and checked and certified by the site engineers for billing purpose.

7.3 If measurement sheets submitted are illegible, incomplete or incorrectly booked, they will be returned to the contractor.

7.0 PERMISSIONS / APPROVALS

Contractor shall be responsible for obtaining approval from authorities like ADA / LDA and any other concerned authority, if required for completion of the work. Contractor must take the prior appointment from the resident for carrying out the work.

8.0 REFERENCE SPECIFICATION, CODES AND STANDARDS

The contractor shall carry out the work in accordance with this specification, Client's Engineering Standards: ASME B31.8 - Gas Transmission and distribution piping systems; Australian standard 3723 - Installation and Maintenance of Plastics Pipe Systems for Gas; Oil India Safety Directorate Norms (OISD), Latest PNGRB guidelines and the American Gas Association Document -Purging Principles and Practice.

Should the contractor find any discrepancy, ambiguity or conflict in or between any of the Standards and the contract documents, then this should be promptly referred to the Engineer - in- charge(EIC) for his decision, which shall be considered binding on the contractor.

9.0 SAFETY

The contractor shall take care of all safety norms applicable for such works at site. Contractor shall provide all safety appliances e.g., safety helmets, gloves, safety belts, ladders, staging, shoes, goggles etc.

All necessary care shall be taken while working at heights and workmen with proper skills and work permits only shall be deployed. Proper barricading and warning signs shall be installed. Adequate care shall be taken while taking supports from balconies, chajjas / protection parapets and like structures to be sure of strength and adequacy of the same.

No night working shall be permitted, without proper lighting and prior approval of EIC.

10.0 RIGHT-OF-USE SURVEY AND MARKING

The route of the pipeline to be installed shall be decided with consent of the consumer and SE / EIC. Contractor must ensure that the persons/ workers/ supervisors/workers at site shall have proper identity cards prior to entering the premises of the consumer.

No temporary or permanent deposit of any kind of material resulting from the work shall be permitted in the approach and any other position which might hinder the passage and / or natural water drainage or any area where there is objection from consumer

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The contractor shall obtain necessary permissions from landowners and tenants and shall be responsible for all damages caused by the construction and use of such approaches, pavements, gardens, rooms, walls, roof etc., at no extra cost to Client.

A survey will be conducted jointly by Client / Consultant and the contractor at each premises or housing colony to be supplied. The survey record will note customer details, the potential gas supply points and proposed meter positions and estimates of material quantities. The contractor's representatives will make as sketch of the agreed pipe routes, if necessary.

The contractor will be responsible for contacting the customer and making the necessary arrangements for access, and appointments to carry out the work.Client will not be responsible for any time lost due to broken appointments or disputes with customers.

The contractor shall confine its operations within limits of the Right-in-use. The contractor shall restore any damage to property outside ROU, attributable to him.

The contractor shall also carryout all necessary preparatory work if needed to permit the passage of men and equipment. Lights, curbs, signs shall be provided wherever and / or required by the Consultant / Client necessary to protect the public.

11.0 PROTECTION OF STRUCTURES AND UTILITIES

The contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work.

While painting contractor must take care of the consumer premises while carrying out the job/ such as spillage on floor, walls, ceilings, sun shades etc. if the same does occur, the contractor is to immediately make good to original.

12.0 G.I ABOVE GROUND SERVICE PIPE

The GI service pipe installation work includes all work necessary to connect from the PE / GI transition fitting on the down-stream of the PE service, to the customers appliance, including the installation of appliance valve and isolation valves, except, Suraksha hose, Meters, Regulator for which separate rate shall be paid as per SOR Item of this document. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Amongst other things he will be required to provide ladders, scaffolding pipe, dies, tripods, vices, fittings and teflon tape, drills for concrete and other masonry, drills for timber and laminated surfaces inside customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, paint for pipe marking etc. GI pipes, fittings, valves and regulator shall be provided by Client.

All GI risers on the outside of buildings shall be fully supported to carry the weight of piping. Risers shall be supported by a flanged foot, or similar device, capable of supporting the total weight of the riser. The riser shall rise in a vertical line from its point of support to its highest point with a minimum of changes in direction. The threading of GI pipe shall be NPT and conforming to ASME / ANSI B1. 20.1.

Contractor has to supply different types / sizes of approved clamps (Mild Steel) for fixing G I pipes suiting to the site conditions and the same shall be painted before fixing, as per the painting s pecifications. Every fresh lot of the clamps, brackets, regulators boxes and other consumables shall be approved by the EIC prior to start of installation. All riser and lateral pipe shall be clamped to the building at intervals not exceeding two meters.
All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 meter. Maximum distance between clamps shall be 1.0-1.5m when pipe goes to the straight ,if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from center line of fittings at every sides. However, the same may be changed as per site conditions/as directed by E IC. Minimum gap between pipe and wall shall be 25 mm. The joints/fittings of the GI installations shall be painted only after carrying out testing of the installation.
Where pipe passes through a balcony floor, the floor surface shall be made slightly elevated around the service pipe or its surrounding sleeve to prevent the accumulation of water at that point. Where a short piece of sleeve is used around the gas pipe, the sleeve should be embedded in the concrete with a mix o f mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be beveled such as to prevent an accumulation of water. Supply of clamps for al l s izes o f t he G I p ipes are in contractor's s cope. Contractor h as t o t ake p rior approval for design of clamps, paintings etc.

Pipe shall preferably enter a building aboveground and remain in a ventilated location. The location for entry shall be such that it can be routed to the usage points by the shortest practicable route.

The rates are to be paid in bands as shown in SOR e.g., the ground floor to 2nd floor band covers pipe work laid from the ground fl oor level to ceiling level on the 2 nd floor. Payment will be in incremental stages. e.g., if a pipe is laid from the ground floor to the 9th floor of a building, the length of pipe laid up to the 2 nd floor will be paid in the first band, The length of pipe laid between 3rd and 5th floor will be paid in second band and the length of pipe from the 6th floor and above will be paid for in the third b and. However, it may be noted that all the piping done inside the premises shall be considered as ground floor piping, the payment for such work shall be as per first band. The Pipe installation includes all fittings, Flexible hoses, clamps, Regulators etc.
The contractor shall ensure that gas supply shall not be provided to the customer in any concealed piping.

13.0 COPPER ABOVE GROUND SERVICES PIPE

The Copper service pipe installation work includes all work necessary to connect from the downstream of Meter upto the isolation valve and flexible hose prior to the customers appliance, including the installation of valves, including application of lacquer paint etc. The contractor shall be required to provide all equipment, tools

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and material necessary to execute the work in an efficient and effective manner. Amongst other things he will be required to provide ladders, scaffolding pipe, drills for concrete and other masonry, drills for timber and laminated surfaces inside customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, etc. Copper pipes, fittings, valves and regulator shall be provided by Client.

During installation the COPPER pipe is to be cut to proper length with a tube cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer / inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional Blow torch to melt Solder wire and lacquering.

Lacquer is to be applied to the copper tubes by mixing lacquer with thinner in approved proportions and applied by dipping method or with brush. It should be applied only once at a time and drying time of minimum one hr. is to be given.

Contractor has to supply different types / sizes of approved clamps for fixing COPPER pipes suiting to the site conditions and the same shall be painted, if required, before fixing, as per the painting specifications.

Contractor has to take prior approval of EIC for quality of the clamps, solder, flux, lacquer, thinner etc. The approval shall be taken for every fresh lot of clamps from EIC before installation at site.

All riser and lateral pipe shall be clamped to the building at intervals not exceeding one meter.

Where pipe passes through a balcony floor, the floor surface shall be made slightly elevated around the service pipe or its surrounding sleeve to prevent the accumulation of water at that point. Where a short piece of sleeve is used around the gas pipe, the sleeve should be embedded in the concrete with a mix of mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be beveled such as to prevent an accumulation of water. Supply of clamps for all sizes of the COPPER pipes is in contractor's s cope. Contractor has to take prior approval for design of clamps, painting etc.

Pipe shall preferably enter a building aboveground and remain in a ventilated location. The location for entry shall be such that it can be routed to the usage points by the shortest practicable route.

The rates, mentioned in SOR are applicable from ground floor to 2nd floor. However, it may be noted that all the piping done inside the premises shall be considered as ground floor piping, the payment for such work shall be as per the SOR.

After installation of the entire piping system, final painting shall be done to the satisfaction of EIC.

All copper piping shall be clamped to the building at intervals not exceeding 500mm. These solder wire shall be of reputed company , lead free as per BS 29453: 1994 (Soft solder alloys) and supplied in coils. The details specification attached in tender. Solder for use with Cu tube & fittings generally melt within the temperature range of 1800C to 2500C. The contractor has to furnish the certificate of confirmation of standards before start of work.

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14.0 TESTING OF GI INSTALLATION

14.1 The installation from PE/ GI transition fitting up to regulator shall be tested at the [pressure of 6.0 bar (g)].

14.2 The testing of GI riser pipe up to regulator shall be done with the isolation valve in open condition and open end plugged.

14.3 The GI pipe shall be painted with one coat prior to installation in riser, however the ends / joints shall be painted only after carrying out testing of the installation.

14.4 The GI installation from regulator outlet to appliance valve (except meter) shall be tested at a pressure of 2.0 bar (g) for a hold period of 4 hours and all the joints shall be checked with soap solution.

14.5 The meter shall be removed while carrying out the testing and joints of the meter shall be tested on line with soap solution after completion of the work. Proper test ends shall be made along with gauges and got approved by EIC. For the installation to be tested by manometer or diaphragm gauge the meter shall not be dismantled/removed and testing shall be carried out at 100 m bar with holding period of 15 min with no pressure drop.

14.6 The calibrated pressure gauges of suitable range shall be supplied by the contractor for testing.

14.7 The pressure gauges shall be calibrated from time-to-time as desired by Engineer In- charge but positively once in every six months.

14.8 Valves supplied by Clients, shall not be used for testing purpose

14.9 The details of testing shall be properly recorded in the measurement cards

15.0 INSPECTION

Any defect noticed during the various stages of inspection shall be rectified by the contractor to the entire satisfaction of Engineer-in-Charge before proceeding further. Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good any defects found during final inspection/ guarantee period/ defect liability period as defined in general condition of contract.

16.0 PURGING & COMMISSIONING

Payment for the tapping of live mains and GI piping prior to the actual purge is included in normal laying & testing. The connection may involve the fitting of a temporary bypass, disconnection etc.
Purging shall be carried in accordance with the principles defined in the American Gas Association Publication "Purging Principles and Practice".

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In addition the contractor shall submit and have approved Purging Plan before commencing any purging work. The plan shall include, but not be limited to the provision of the following materials and equipment: personal safety equipment, fire extinguisher, Purging adapter, Purge stack with flame trap and gas sampling point, Gas sampling equipment (may be gas leak detector), s quash-off tool, Polyethylene connecting pipe work etc.

The plan shall also include the purging process along with detail on the sequence of events. The process is to also specially/mention the need to lay a wet cloth over the GI pipe and in contact with the ground, to disperse static electricity during the purging work.

A purging stack with flame trap shall be used when purging services. Care shall be taken to ensure that the purge outlet is so located that vent gas cannot drift into buildings.

The purging work should be performed as follows,

- Ensure the method of purging is such that no pockets of air are left in any part of the customer's piping.

- Ensure that all appliance connections are gas tight, all appliance gas valves are turned off and there are no open ends.

- Where possible, select an appliance with an open burner at which to commence the purge i.e., a hotplate burner.

- Ensure the area is well ventilated, and free from ignition sources.

- Ensure branches that do not have an appliance connected are fitted with a plug or cap.

- Turn on one burner control valve until the presence of gas is detected. A change in the audible tone and smell is a good indication that gas is at the burner. Let the gas flow for a few seconds longer, then turn off and allow sufficient time for any accumulated gas to disperse.

- Turn on one gas control valve again and keep a continuous flame at the burner until the gas is alight and the flame is stable.

- Continue to purge until gas is available at other appliances.

17.0 INSTALLATION OF METERS

The work in this section includes :

17.1 Installation of domestic and non-domestic /small commercial meters with associated inlet and outlet connections (GI/Brass fitting), on the wall with approved meter brackets and angles.

17.2 Supply of approved meter brackets and angle brackets, properly painted with one coat of Zinc primer and two coats of synthetic enamel paint of approved make. Asketch of the brackets is enclosed herewith. It is required that one sample of each type of bracket is got approved beforehand.

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17.3 Firmly securing t he meters on the wall with good quality supply of proper rowel plugs, screws etc. In case the rowel plugs are not holding than wooden blocks or other fixing arrangements like cement etc. to be used for proper grouting.

17.4 The same rates of respective SOR Item will apply irrespective of whether the meter is situated inside or outside the property. Where a bank of meters is constructed the rate shall be for each complete meter installed.

17.5 The above activities along with restoration of the area to original shall be carried out to the complete satisfaction of consumer and EIC.

17.6 The meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of Gas to atmosphere in case of any smell/ leakage of Gas. The meter installation will not be provided in any fixed enclosures, cabinets (below or above the slab)or confined space in the customer premises.

17.7 The contractor shall ensure that GI installation and rubber hose shall not be exposed to direct heat of Gas burners. The installation should have minimum clearance of about 1m from electric [point mains and switches. Minimum distance between appliance valve and Gas Burners shall be 0.3 meters. The isolation valve shall be installed after entering the customer premises /kitchen but before the meter installation.

18.0 PAINTING OF GI PIPES

The entire length of the pipeline along with fittings and clamps are to be painted after proper surface preparation and painting as follows.

- One coat of Primer application (Appropriate Zinc based primer)
- Two coats of synthetic enamel paint – canary yellow of minimum of 30microns per coat of reputed make like Asian, Berger, Nerolac.

All painting materials including primers and thinners brought to site by contractor for application shall be procured directly from manufacturers/ dealers as per specifications and shall be accompanied by manufacturer's test certificates. Paint formulations without certificates are not acceptable.

Engineer-in-Charge at his discretion, may call for tests for paint formulations. Contractor s hall arrange to have such tests performed including batch wise test of wet paints for physical & chemical analysis. All costs there shall be borne by the contractor.

The painting work shall be subject to inspection and certification by Engineer-in- Charge at all times.

After installation of the entire piping system, final touching shall be done to the satisfaction of EIC.

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19.0 BOX FOR REGULATOR

Boxes will be supplied and installed outside for regulators after due approval of the sample. The boxes will be installed as per requirement and as per instructions of Client.

The box brackets are to tightly secured to the wall with good quality proper Rowel plugs, screws etc. Wooden blocks to be used in case rowel plugs, do not hold properly.

All the boxes shall be thoroughly cleaned, painted with approved colour code.

As the boxes are installed outside it is to be ensured that they are painted properly to avoid rusting / weathering.

A sketch of regulator box is enclosed herewith.

20.0 CONVERSION OF DOMESTIC APPLIANCES

The work in this section includes,

The changing of nozzles and associated controls in accordance with manufactures instructions for both domestic and imported burners/ ovens/grills/hotplate.

The changing of old appliance connection hoses and nozzles and re-greasing taps as necessary.
The contractor has to supply all types of nozzles / jets required for all types of appliances including imported burners, Grills, Ovens, Cleaning and performing minor maintenance of appliances
Testing for gas escapes and the soundness and performance o f the appliance.
Instructing the customer in the safe use of natural gas and for fixing of safety and conversion labels.
Contractor must attend the complaints regarding appliances till the total area is handed over to Client's operation and maintenance.
All consumables (Nozzles, greases etc.) are in contractor's scope. Changing or repairing of any items damaged during conversion.

It may be noted that the rates will apply to all appliance found in both domestic and commercial premises. The contractor will be required under the Rates to provide both Pin gauges and standard sized nozzles.

21.0 RESTORATION

Contractor has to restore the area where ever he has carried out drilling, clamping etc. to its original condition to the satisfaction of the consumer and to ensure no passage to the premises and seepage. If the work was carried out in Govt. Flats (PWD), contractor has to restore the area according to CPWD specifications. For government flats the contractor has to obtain a clearance certificate from the concerned authorities maintaining the flats, after completion of the work.

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Where slabs and brick work are to be reinstated, the level of the compacted sub- base is to be adjusted according to the slab / block thickness. The slabs or brick work should be laid on moist bedding material, which should be graded sand, mortar or mortar mix. The slabs or brick work should be tapped into position.

The restored slabs or brick work should match the surrounding surface levels. Joint widths should match the existing conditions, and be filled with a dry or wet mix of mortar.

Wherever any items of the consumer is damaged / broken during working, the same will be made good or replaced to the total satisfaction of the consumer.

The contractor will be responsible for the maintenance of all restoration carried out, for the duration of the contract guarantee period.

The contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose and proper. Where the required standards are not achieved the contractor will be required to replace the defective reinstatement work.

Note that Payment for GI /Copper piping will only be authorized on satisfactory restoration, and where the sites has been cleared of all surplus materials etc.,

22.0 SUBMISSION OF FINAL RECORDS

Contractor shall submit the following documents in three sets each:

a) Total list of houses & commercial establishments in the area allotted to him giving details of connections provided & reasons where connection could not be given / completed.
b) The details recorded in measurement cards of every domestic house.
c) Details of houses where extra piping done along with materials used.
d) Total material consumption report.
e) Material reconciliation with respect to the materials issued.
f) Test reports & test certificates of gauges etc.
g) Any other documents / records required.

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TECHNICAL SPECIFICATION

FOR HDPE

PIPES

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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Contents of TS No. BR/TS/001

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1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of HDPE Pipes used for casing purpose of carrier pipe, supplying natural gas.

2.0 SCOPE OF WORK

2.1 The scope of the tendered will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of HDPE Pipes of ratings and grades as indicated in the Material Requisition & Schedule of Rates, as per IS:4984 (Specification for HDPE Pipes for water supply).

2.2 All codes and standards for manufacture, testing, inspection etc. shall be of latest edition.

2.3 Purchaser reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 INSTRUCTION OF TENDERER

3.1 Length of the Pipes and their supply will be as per following :-

- DN 50 – In each coils of 100 mtrs. Length
- DN 75 – Each pipe of 12 mtrs. length minimum
- DN 90 – Each pipe of 12 mtrs. length minimum
- DN 110 – Each pipe of 12 mtrs. length minimum
- DN 250 – Each pipe of 12 mtrs. length minimum
- DN 315 – Each pipe of 12 mtrs. length minimum

3.2 Protection

i) The ends shall be protected by proper end caps to prevent from shocks and ingress of the foreign body.

ii) Coils shall be covered by black PVC/ PE Film to prevent exposure to direct sun light.

3.3 The successful bidder shall submit following for approval of Purchaser/ Consultant after placement of order

a) The Quality Assurance Plan (QAP & Sampling Plan)

b) Material test report as per clause 5 of IS:4984.

c) Performance Requirements (clause 8 of IS:4984)

d) Type Test (clause 9.1 of IS:4984).

3.4 The bidder shall submit following documents at the time of bidding,

a) BIS Certification

b) List of current orders in hand for similar items with full details such as specification, name of purchaser etc.

c) Details of the largest supply executed

d) Name and address of proposed test laboratories alongwith their credentials/ past records for carrying out all required tests.

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TECHNICAL SPECIFICATION
FOR
MEDIUM DENSITY
POLYETHYLENE FITTINGS
AND
ELECTRO-FUSION

FOR

NATURAL GAS DISTRIBUTION

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
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C O N T E N T S

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1.0 SCOPE AND FIELD OF APPLICATION

This specification elaborates the requirements for Electrofusion fittings in the nominal size range 16 to 125 mm made from PE compound used with PE pipes for supply of natural gas and to be used at operating temperature not more than 40°C.

The material grades to be used are PE 100. The fittings shall be yellow or black in colour.

Electro Fusion Fitting Jointing

1.1 For Electro Fusion fitting jointing an electrical resistance element is incorporated in the socket of fitting which when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

1.2 The effectiveness of this technique depends on attention to the preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surface are clean. If ovality causes gap between concentrically located pipe and the fitting to exceed 1% of the pipe OD after re-rounding to ensure correct welding. If the gap still exceeds 1% of the pipe OD after re-rounding then a check should be made of the pipe OD dimensions to determine if it meets specification.

1.3 The maximum gap between eccentrically located pipe and fitting i.e. pipe touching fitting at one point must not exceed 2% of the pipe OD.

1.4 Sometimes coiled pipes may be too oval to fit into couplers, or the end of the pipe may make the alignment of the ends impossible. In such circumstances the use of a mechanical pipe straightener or rounding tool is necessary.

2. EQUIPMENT

2.1 The control box input supply is to be from a nominal 240V generator, which is normally of approximately 5kVA capacity. The Nominal output of the generator is to be 240V + 15%, -10% between no load and full load .

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Control box are to include safety devices to prevent excessive voltages being present at the control box output. The safety devices shall operate in less than 0.5 s
Note that extension leads are not to be used on the control box outlet connections.
Warning : Control boxes are not intrinsically safe and must therefore not be taken to trench.

A mechanical pipe surface preparation tool is to be used before fusion is attempted. The tool is capable of removing the oxidized surface of the pipe in excess of the in sertion depth. The tool is to remove a layer of surface material 0.2-0.4 mm thick form outer surface of the pipe preferably in a continuous strip of swarf over that length and round of the pipe.
Pipe clamps for rest raining, aligning and re-rounding the pipes in the fusion process are to be used.

Pipe cutters with saw and saw guide

Protection against adverse weather conditions.

2.2 Electro Fusion Jointing Method / Procedure

Preparation

- Ensure there is sufficient space permit access to the jointing area . In a trench a minimum clearance of 150 mm is required.
- Check that the pipe ends to be jointed are cut square to the axis of the pipe and any burrs removed.
- Wipe pipe ends clean lint free material to remove traces of dirt or mud
- Mark the area over which the oxidized pipe surface is to be removed I.e. by placing the socket of the bagged fitting along side the pipe end. Trace a line round the circumference at the appropriate distance from the end of the pipe using a felt tip pen or similar.

Note that the fitting should not to be removed from the packaging at this stage.

- Connect the electro fusion control box input leads to the generator

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- Check that the reset stop button, if fitted on the control box is in the correct mode.

- Check that reset stop button if fitted on the control box is in the correct mode
- Using the pipe end preparation tool, remove the entire surface of the pipe uniformly, preferably in continuous swarf over the area identified. i.e. in excess of insertion depth.

- A mechanical scraper could be used however there is a considerable risk that the end preparation will not be adequate with the use of such a tool.

Note that the prepared pipe surface should not be touched by hand.

- Remove the fitting from its packing and clean the scrapped area of the pipe surface and the bore of th e fitting with a disposable wipe impregnated with Iso-propanol / Acetone. Ensure the prepared surfaces are completely dry before proceeding

Note that while Iso-propanol is a suitable cleaner , its use is subject to local health and safety regulation.

Check that the pipe clamps are of the correct size for the pipes to be jointed .
Insert the pipe ends into the fitting so that they are in contact with centre stop
Using the pipe clamps, secure the pipes so that they cannot move during the fusion cycle. Check that the pipes ends and the fitting are correctly aligned.
Connect the control box and check that they have been fully inserted.
If required by the control box enter the fusion jointing time into the control box timer. The joining time is indicated on the fitting. Check the correct time as shown on the control box display.

Note 1: Automatic control box are available which obviate the need to enter the fusion time
Note 2: Gloves and goggles should be worn during the fusion process

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Note 3: If the fusion cycle terminates before completion of the countdown , check for faults as indicated by the control box warning lights and check that there is adequate fuel in the generator. DO NOT attempt a second fusion cycle within one hour / cooling of joint at Ambient temperature of the first attempt.

2.3 **Records**: Records of appropriate servicing and calibration shall be kept.

2.4 **Training**: It is necessary that operators , inspection and supervisory personnel acquire the skills of Electro-fusion fitting .The necessary training should be carried out by qualified instructor with the objective of enabling participants to

- Understand the principles of electro-fusion fitting jointing
- Identify pipe and appropriate fitting markings
- Carry out pre jointing machine and equipment checks
- Make satisfactory Electro-fusion joints from pipes and fittings of different sizes
- Inspect for and identify joints of acceptable

Note that some form of assessment and certification should be associated with the training . The certificate should detail the pipe and fitting size range and the equipment used. A register of successful participants should be kept.

2.5 Electro-Fusion Saddle Jointing

For Electro Fusion fitting jointing an electrical resistance element is incorporated in the socket of fitting which when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

The effectiveness of this technique depends on attention to the preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surface are clean.

Method of holding the tapping tee saddle during the fusion cycle are used namely top loading and under clamping space around the pipe. In a trench a minimum clearance of 150 mm is required.

2.6 Electro-Fusion Saddle Jointing Method / Procedure.

Preparation

Expose the pipe onto which the taping tee is to be assembled , ensuring there is sufficient clear space around the pipe . In a trench a minimum clearance of 150mm is required.

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Clean the pipe over the general area on which the saddle is to be assembled using clean , disposable lint free material .

Without removing the fitting from its packaging , place over the required position on the main . Mark the pipe surface all around and clear of the saddle base area using a felt tip pen or similar.

Remove the surface of the pipe to a depth of 0.2 to 0.4mm over the full area marked using a suitable tool, remove the swarf.

Connect the electro fusion control box input leads to the generator .
Check that the reset stop button, if fitted on the control box is in the correct mode.

Check that reset stop button if fitted on the control box is in the correct mode.

Remove the fitting from its packing and clean the scrapped area of the pipe surface and the bore of the fitting with a disposable wipe impregnated with Iso-propanol / Acetone. Ensure the prepared surfaces are completely dry before proceeding

Note that while Iso-propanol is a suitable cleaner , its use is subject to local health and safety regulation.

Position the fitting base onto the prepared pipes urface , and bring the lower saddle into position then gradually and evenly tighten the nuts until the upper saddle makes firm contact with scrapped pipe.

Check that there is sufficient fuel for the generator to complete the joint .
Start the generator and check that it is functioning correctly

Switch on the control box if applicable

Connect the control box output leads to the fitting terminals and check that have they have been fully inserted.

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If required by the control box enter the fusion jointing time into the control box timer. The jointing time is indicated on the fitting . Check the correct time as shown on the control box display.

Note 1 : Automatic control box are available which obviate the need to enter the fusion time
Note 2 : Gloves and goggles should be worn during the fusion process

Press the start button on the control box and check that the heating cycle is proceedings as indicated on the display.

On completion of the heating cycle , the melt indicators where incorporated should have risen . If there is no apparent move in the melt indicators a new saddle joint should be made. Cut the tee of the faulty joints from its base.

If a satisfactory joint has been made , the joint is to be left in the clamps for the cooling time specified on the fitting label or any the automatic control box

Note 3 : If the fusion cycle terminates before completion of the countdown, check for faults as indicated by the control box warning lights and check that there is adequate fuel

The connection of the service pipe to the fitting outlet should be carried out in accordance with the procedure of the appropriate section of this item

Do Not attempt to tap the main with the integral cutter for at least 10 minutes after the completion of cooling cycle .

Records
Records of appropriate and calibration of electro fusion machines and joint shall be kept.
Trainings

AS PER 2.4

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Note that some form of assessment and certification should be associated with the training. The certificate should detail the pipe and fitting size range and the equipment used. A register of successful participants should be kept.

2.7 STOPPING THE GAS FLOW

In the operation of a distribution system there is a periodic need to stop the gas flow for either routine or emergency maintenance. The flow may be stopped through the use of installed fitting such as valves. Where installed fittings are not available or the use of such would cause significant supply disruption, then one of the following methods may be employed.

2.8 SQUEEZE - OFF

a. To control the gas flow a special tool may be used to squeeze the pipe walls together. Hydraulic jacks are used to supply the necessary force to compress the pipe walls for sizes 90 mm and above.

b. As will be seen the squeeze-off equipment comprises two bars to apply pressure to outside of the pipe. The bars are bars are brought together either manually or hydraulically, squeezing the pipe material together until a seal is formed where the upper and lower walls meet.

c. The hydraulic machines should have a spring return for the jack and locking to prevent accidental release of pressure during operation. All squeeze – off machines should be fitted with check plate or stops to avoid over compression of the pipe.

d. Where the pipe walls are compressed the polyethylene pipe will be severely deformed in the regions of maximum compression. The pipe will eventually regain its original shape after squeezing but there will be reduction in some pressure bearing properties.

e. A complete stop may not always be obtainable because of wrinkling of the inside of the pipe. If a complete stop is required than a second squeeze can be used, with an intermediate vent to remove the gas which passes the first squeeze from say the trench of three pipe diameters area. A second squeeze

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– off procedure should be a minimum of three pipe diame ters and right angles to the squeeze.

f. While not essential it would be good practice to fit a reinforcing stainless steel band / do not squeeze again adhesive tape around the pipe upon the completion of squeezing operation.

2.9 BENDING – BACK

Bending back of the pipe may be performed where the pipe has been served damaged and stopping they gas flow is imperative. Its application is of a temporary nature and will provide a relief until a permanent repair can be affected. The section of pipe, which has been bent back, will to be replaced because of th e damage caused by the serveness of the band back operation. The need of any bend back operation is most likely to occur as a consequence of damage caused to a PE service pipe.

While it is not the prime function of a saddle tee , controlling the flow in the service may be achieved by opening upon an installed saddle tee and winding down the internal tapping tool to shut off the flow to the service pipe.

3. SYMBOLS & DEFINITIONS

3.1 Symbols for Electro fusion Fittings

3.1.1 Symbol for Electro Fusion Socket Fittings

The dimensions and main symbols used in this part of ISO 8085 are shown in figure 1, where

D1 is the mean inside diameter in the fusion zone comprising the mean inside diameter measured in a plane parallel to the plane of the mouth at a distance of L3 + 0.5 L2 from the plane at the mouth.

D2 is the minimum bore comprising the minimum diameter of the flow channel through the body of the fitting.

L1 is the depth of penetration of the pipe or of the male end of a spigot fittings.

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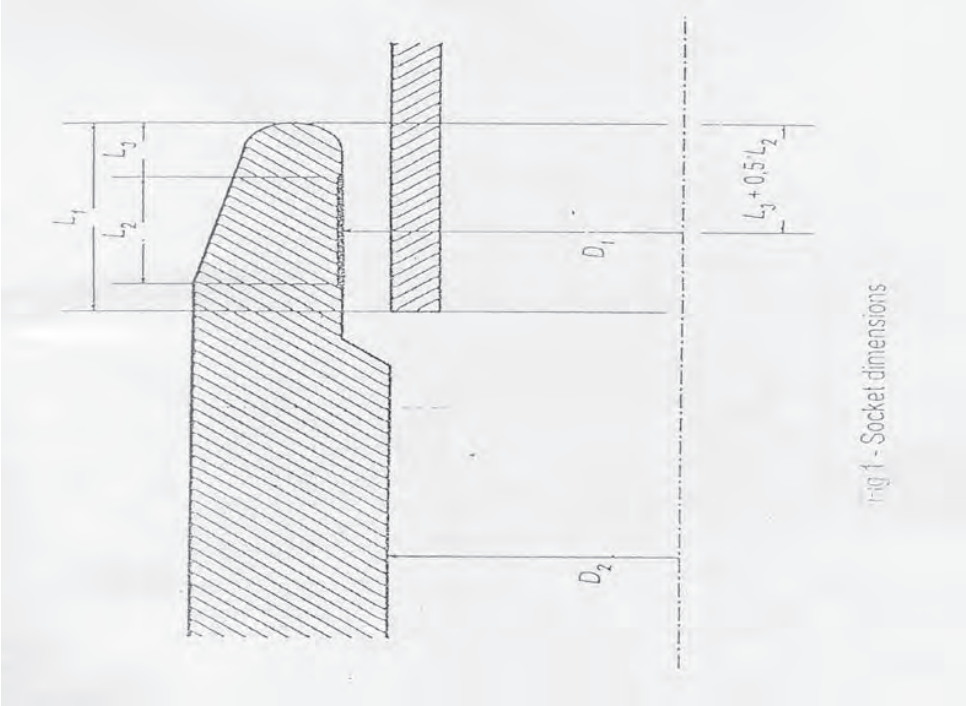
L2 is the nominal length of the fusion zone corresponding to the heated length.

L3 is the nominal unheated entrance length of the fitting comprising the distance between the mouth of the fittings and the near end of the fusion zone.

3.1.2. Symbol for Electro Fusion Tapping Tees

The main symbols used for tapping tees are shown in Figure 2, where. **h** is the height of the service pipe and comprising the distance between the axis of the main pipe and the axis of the service pipe.



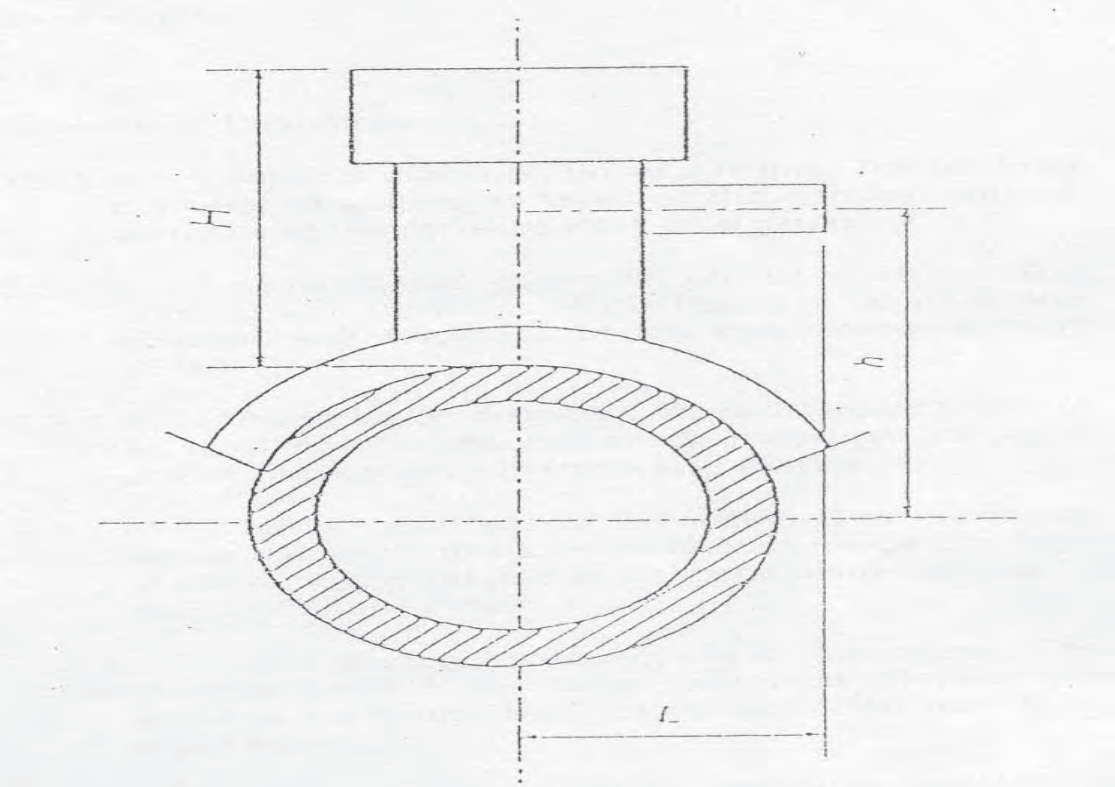


Fig 2 - TappingTee Dimensions

L is the width of the tapping tee and comprising the distance between the axis of the main pipe and the plane of the mouth of the service pipe.

H is the height of the saddle which comprises the distance from the top of the main to the top of the tapping tee or saddle.

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3.2 Definitions

3.2.1. Geometrical Definitions

3.2.1.1 Nominal diamter , DN, of a fitting:

The nominal diameter of a fitting is taken as the nominal outside diameter of the corresponding pipe series

3.2.1.2 Nominalwallthickness.en,ofafitting:

The nominal wall thickness of the fittings is taken as the nominal wall thickness of the corresponding pipe series.

3.2.1.3 Mean inside diameter

The arithmetic mean of at least two inside diameter measured at right angles to each other in transverse planes.

3.2.1.4 Out of roundness of the socket

The maximum inside diameter minus the minimum inside diameter of the socket, measured in the same plane, parallel to the plane of the mouth.

3.2.1.5 Maximum out of roundness of the socket:

The greatest value of the out of roundness between the plane of the mouth and a plane separated from it by a distance L1.

3.2.1.6 SDR valve for a fitting:

The SDR value for a fittings is taken as being the same as that for the corresponding pipe series.

Where, SDR = dn/en

3.2.1.7 Wall thickness, E of a fitting:

The wall thickness of a fittings at any point of the body of the fitting which could be submitted to a stress inducted by the pressure of the gas in the piping system.

3.2.2 Material Definition

3.2.2.1 Virgin Material:

Materials in form such as granules or powder that has not been subjected to use or processing other than that required for its manufacturer and to which no re-processable or recyclable materials have been added.

3.2.2.2 Own Reprocessable Material

Material prepared from rejected unused pipes, fittings or valves, including trimmings from the production of pipes, fittings or valve, that will be reprocessed in a manufacturer's plant after having been previously processed by the same manufacturer by a process such as in jection moulding or extrusion.

3.2.2.3 Compound:

A homogenous mix of base polymer (PE) and additives, i.e. antioxidants, pigments, UV-stabilisers and others, at a dosage level necessary for the processing and of compon ents of this standards. The additives shall not have a negative influence on the performance with respect to feasibility. All additives shall be uniformly dispersed.

3.2.3 Definition related to material characterstics

3.2.3.1 Lower Confidence Limit (LCL):

A quantity with the unit in mega Pascals (MPs), which can be considered as a property of the material representing the 97.5% lower confidence limit of the predicted long-term hydrostatic strength at a temperature 20° C for 50 years in water.

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3.2.3.2 Overall Service (Design) Coefficient (C):

An over all coefficient with a value larger than 1.0 which takes into consideration service conditions as well properties of the components of a piping system other than those represented in lcl. For gas applications, C can have any value equal to or greater than 2.0.

3.2.3.3 Minimum Required Strength (MRS):

The value of the lcl rounded down to the next lower value of the R 10 series when the lcl is less than 10 Mpa, or to the next lower value of the R 20 series when the lcl is greater than or equal to 10 Mpa.

Note: R10 and R 20 series are the Renard number series according the ISO 3 and ISO 497

3.2.3.4 Melt Mass Flow Rate:

A value relating to the viscosity of the molten material at a specified temperature and rate of shear.

3.2.4 Definitions Related To Service Conditions:

3.2.4.1 Gaseous Fuel:

Any fuel which is in the gaseous state at a temperature of + 15° C and a pressure of 1 bar.

3.2.4.2 Maximum Operating Pressure (MOP)

The maximum effective pressure of the gas in the piping system, expressed in bar, which is allowed in continuos use. It takes into account the physical and the mechanic characteristics of the components of a piping system.

Note : It is given by the equation : $MOP = \frac{20 * MRS}{C*(SDR-1)}$

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3.2.5 Definition on Design of Electrofusion Fittings:

3.2.5.1 Electro Fusion Socket Fittings:

A polyethylene (PE) fittings which contains one or more integral heating elements, that are capable of transforming electrical energy into head to realise a fusion joint with a spigot – end or a pipe.

3.2.5.2 Electro Fussion Saddle Fittings:

A polyethylene (PE) fitting (top loading or wrap around) which contains one or more in tegral heating elements, that are capable of transforming electrical energy into head to realise a fusion joint onto a pipe.

3.2.5.3 TappingTee:

An Electrofusion saddle fitting which contains an integral cutter, to cut through the pipe wall. The cutter remains in the body of the saddle after installation.

3.2.5.4 Branch Saddle:

An Electrofusion saddle fitting which requires an ancillary cutting tool for drilling a hole in the adjoining main pipe.

3.2.5.5 URegulation:

Control of the energy supplied during the fusion process of an Electrofusion fitting, by means of the voltage parameter.

3.2.5.6 IRegulation:

Control of the energy supplied, during the fusion process of an electrofusion fitting by means of the current parameter.

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4. DESIGNATION

4.1 Fittings shall be designed according to the grade of material, nominal diameter and Standard Dimension Ratio (SDR).

4.2 **Grade of Material:**

4.2.1. Fittings shall be classified according to the grade of material as given in following table:

Table–1

Material	M.R.S. Mpa	1 cl (20° C, 50 Yrs 97.5%) Mpa	Maximum Allowable Operating Pressure
PE 80	8.0	$8.00 \leq 1\ cl \leq 9.99$	5.5 Bar
PE 100	10.0	$10.00 \leq 1\ cl \leq 11.19$	7.0 Bar

4.3 **Nominal Diameter**

The Nominal Diameter for fittings covered in this standard are 16, 20, 25, 32, 40, 63, 75, 90, 110, 125 mm.

4.4 **Material**

4.4.1 Polyethylene Compound:

The Polyethylene compound used in the manufacture of fitting shall be a cadmium free compound. It shall be free from visible water, shall comply with the requirements as specified in Table – 2.

Table-2 : Characteristics of PE Compound

Characteristics	Units	Requirements	Test Parameters	Test Method
Conventional Density	Kg/m^3	≥ 930 (base polymer)	23 °C	ISO 1183 - ISO 1872/1
Melt Mass-flow Rate	g/10 min	± 20% of value nominated by compound producer	190 °C condition 18	ISO 1133
Thermal Stability	Minutes	> 20	200 °C (2)	ISO TR 10837
Volatile Content at Extrusion	mg/kg	≤ 350		ISO 4437 Annex. A
Water Content (3)	mg/kg	≤ 300		ASTM D 4019
Carbon Black Content	% (m/m)	2,0 ≤.....≤ 2,5		ISO 6964
Carbon Black Dispersion (4)	Grade	≤ 3		ISO DIS 11420
Pigment Dispersion (5)	Grade	≤ 3		ISO DIS 13949
Resistance to Gas Constituents	h	≥ 20	80 °C 2 Mpa	ISO 4437 Annex. B
Resistance to rapid crack propagation (RCP) (6) Full Scale (FS) test : d ≥ 250mm	Mpa	The critical pressure in the FS test shall be greater than or equal to the value of the MOP of the system multiplied by 1:5	0°C	ISO DIS 13478
Or S4 Test : in principle according to all diameters (7)	Mpa	The critical pressure in the S4 test shall be equal to or greater than the value of the MOP of the system divided by 2,4 (8)	0°C	ISO DIS 13477
Resistance to slow crack growth en > 5mm	h	165	80 °C, 8,0 bar (f) (9) 80 °C, 9,2 bar (f) (10)	ISO DIS 13479

1) Non black compound shall conform to the weathering requirements to ISO 4437

2) Test may be carried out at 210°C providing that there is a clear correlation to the results at 200°C, in case of dispute the reference temperature shall be 200°C

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3) Only applicable if the compound does not conform to the requirement for volatile content. In case of dispute the requirements for water content shall apply

4) Carbon black dispersion for black compounds only.

5) Pigment dispersion method for non-black compounds only.

6) Only applicable for fittings which incorporate extruded pipe elements.

7) Shall be performed on pipe with a wall thickness of ≥15 mm.

8) This factor 2.4 is still under study and may be subject to change. If the requirement is not met, then retesting by using the Full Scale (FS) test shall be performed

9) Test parameter for PE 80.

10) Test parameter for PE 100.

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5.0 DESIGN

- Fittings shall be designed for system operation at the pressures given in Table – I
- Fittings shall be free from cracks, voids, blisters, distortion, dent or other defects.
- Fittings shall be capable of being fusion jointed to pipes using control boxes. The fittings shall exhibit the strengths and fusion compatibility with, pipes of respective sizes.
- Each fitting shall be bar coated and shall have a permanent fusion indicator.
- Heating coil design shall be such that it should not be damaged during assembly leading to short circuit of heating coil.

5.1 Electrofusion Socket Fittings

Electrofusion Socket Fittings shall incorporate a method of controlling pipe penetration within each socket. The inner cold zone of each socket shall not be less than (0.1 d + 5) mm for sizes upto 125 mm & 0.1 d for sizes greater than 125 mm.

5.2 Tapping Tees

Tapping tees shall be capable of installation by a force between 1 kN and 1.5 kN applied from above and on the centre line of the tapping tees stack. The tapping tees shall provide a means of cutting through the pressurised main pipe and allowing the gas flow into the outlet pipe.

5.3 Transition Pieces

To make connection between steel pipe and PE pipe specially fabricated transition pieces consisting of steel and PE pipes should conform to the requirements mentioned herein.

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5.3.1 PE Pipe:

The PE pipe with one end plain should conform to the specification (IS:14885/ SDR 11)

5.3.2 Steel Pipe:

Black ERW steel pipe should conform to the specifications as laid in API STD 5L (latest revision)

5.3.2.1 Pipe END

One end of the pipe should be bevelled for welding angle of bevel should be 30° + 5°.

5.3.3 Jointing between steel and PE pipes:

Steel and PE pipes should be so jointed in the factory so as to have a monolithic joint which is leak free and should be mechanically as strong or stronger than the PE Pipe.

5.4 **Transition Fittings (PE Pipes to threaded G.I. Fitting):**

Transition fitting for jointing of PE Pipes confirming to specification IS:14855/ SDR 11 to threaded G.I. tubing confirming to specification. The PE end of the transition fitting shall be jointed with PE Pipe with the electrofusion method.

6.0 ELECTRICAL CHARACTERISTICS

For each size and type of fitting, the manufacturer shall declare the nominal resistance of the heating element and specify the production tolerances.

The manufacturer shall demonstrate that satisfactory joint can be made using the extremes of these tolerances.

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All fittings shall have mechanically shrouded malo electrical terminals. The fittings terminals connections shall be su itable for use with voltage less than or equal to 48 volts. Considerations should be given to the design of the shroud with respect to impact damage. When hollow terminal pins are used, the hole at the top of the pin shall be less than 1 mm diameter. The terminal pin material shall be corrosion resistant and the surface finish shall be N7.

Fittings incorporation two electrofusion sockets shall have both sockets fused in a single operation.

The heating elements shall be suitable designed to prevent short circuiting or local overheating/ under heating during the fusion operation. Protective coating applied to the heating element shall not have a detrimental effect on the joint.

The heating element wire shall not be disturbed during assembly.

7.0 DIMENSIONS

7.1 Measuring Temperature

Fittings shall not be me asured within 24 hrs. of manufacturer to allow for normalization. The fittings shall be measured at an ambient temperature of 23 ± 2°C, after a conditioning period of 5 Hrs.

Methods of measurements shall provided the appropriate degree of accuracy, and the re ference conditions specified in this clause 6 apply in case of disputes in dimensional measurement.

7.2 Dimensional Stability

7.2.1 Couplers (Including all form of socket fittings):

All coupler dimensions shall conform to their specified value when the fitting has been stored for a period of 12 months at a temperature of 30 ± 2°C.

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7.2.2 Tappinf Tees and Branch Saddles:

All tapping tee and branch saddle dimensions shall conform to their specified agreed values when the fitting has been stored for a period of 12 month at a temperature of 30 ± 2°C.

TABLE 3 : SOCKET DIMENSIONS

Pipe Size d mm	Limits for average diameter d on each fitting measured over apparent fusion length L mm		Apparent fusion length L mm	Penetration depth L mm
	Maximum	Minimum	Minimum	Maximum
16	16.6	16.4	15	41
20	20.6	20.4	16	41
25	25.6	25.4	18	41
32	32.9	32.5	18	41
40	41.0	40.6	18	49
50	51.1	50.7	20	55
55	56.1	55.7	21	63
63	64.1	63.7	23	63
75	76.3	75.9	25	70
90	91.5	91.1	28	79
110	111.3	111.1	32	82
125	126.7	126.2	35	87
140	141.7	141.2	38	92
160	162.1	161.4	42	98
180	182.1	181.5	46	105

Notes:

1. The apparent fusion length, L, is the length of the integral heating elements, from the first regular section of the element to the end of the regular section, on one side of the fitting. This dimension to be measured from outside edge to outside edge of wire.

2. Any protrusions into the bore of the fitting (e.g. centralization ribs) shall not prevent easy assembly in the field.

3. The overall length of a straight coupler is equal to twice the quoted maximum penetration depth L.

TABLE 4: OVERALL LENGTH OF REDUCERS

Major Diameter mm	Maximum Length mm
25	90
32	90
63	120
90	180
125	215
180	280
200	245
225	260
250	280
280	300
315	320

TABLE 5: BRANCH SADDLE ASSEMBLY OUTLET LENGTH

Off-take Size mm	Shut-off method	Dimension from flange face to crown of main		Dimension from pipe end to crown of main	
		Class B fitting mm	Class B fitting mm	Class B fitting mm	Class B fitting mm
63	Valve	-	-	-	-
63	Squeeze	-	260*	-	-
90	Valve	-	-	400	-
90	Squeeze	400	180**	-	-
125	Valve	-	-	550	-
125	Squeeze	360	180***	-	-
180	Valve	-	-	750	-
180	Squeeze	360	180+	-	-
250	Valve	-	-	-	-
250	Squeeze	360	180++	-	-

* Flange size DN 50
** Flange size DN 100
*** Flange size DN 150
\+ Flange size DN 250
++ Flange size DN 250

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8 PERFORMANCE REQUIREMENTS

8.1 Mechanical Characteristics

Fittings shall be tested using pipes, which conform to ISO 4437, T est samples shall be assembled in accordance with ISO DIS 11413, following the technical instruction of the manufacturer and using fusion equipment conforming ISO DIS 12176.2.

When tested in accordance with the test methods as specified in table – 6 using the indicated parameters, the fittings have mechanical characteristics confirming to the requirements given in Table 6.

TABLE 6: MECHANICAL PROPERTIES

Characteristics	Units	Requirements I	Test	Parameters	Test Method
Hydrostatic strength at 20°C	H	Failure time ≥ 100	End caps orientation conditioning time. Type of test circumferential (hoop) stress pipe PE 80, PE 100, Test temperature.	Type a) free 1 h 9 Mpa, 12.4 Mpa, 20°C	ISO DIS 9356
Hydrostatic strength at 80°C	H	Failure time ≥ 165	End caps orientation conditioning time. Type of test circumferential (hoop) stress pipe PE 80, PE 100, Test temperature.	Type a) free 12 h water-in-water 4.6 Mpa 5.5 Mpa 80°C	ISO DIS 9356
Hydrostatic strength at 80°C	H	Failure time ≥ 1000	End caps orientation conditioning time. Type of test circumferential (hoop) stress pipe PE 80, PE 100, Test temperature.	Type a) free 12 h water-in-water 4 Mpa, 5 Mpa, 80°C	ISO DIS 9356
Cohesive resistance	mm	Length of initiation of brittle fracture L/3	Test temperature choice of method	23°C	ISO 13954 (A) ISO 13955 (A) ISO 13956 (B)
Impact strength (B)		No failure No leakage	Test temperature Falling height Mass of the striker	20°C 23°C 5m 5kg	ISO DIS 13957

Characteristics	Units	Requirements I	Test	Parameters	Test Method
Pressure drop (B)	M^3/h	0.5 mbar : dn ≤ 63 0.1 mbar : dn^2 > 63	Air flow rate Test medium Test pressure	Indicated by the manufacturer Air source 25 mbar	PrEN 12117

(A) Electrofusion Socket Fittings
(B) Tapping Tees

For hydrostatic strength test at 80°C only brittle failure shall be taken into account. If ductile failure occurs before the required time, a lower stress shall be selected and the minimum test time will be obtained from the line through the stress/ time points given in Table – 7.

TABLE 7
Hydrostatic strength (80°C) – Stress/ Minimum Failure Time Correlation

PE-80		PE-100	
Stress Mpa	Minimum Failure Time h	Stress Mpa	Minimum Failures Time h
4.6	165	5.5	165
4.5	219	5.4	233
4.4	293	5.3	332
4.3	394	5.2	476
4.2	533	5.1	688
4.1	727	5.0	1000
4.0	100	-	-

8.2 Physical Characteristics

When tested in accordance with the test methods as specified in Table 8 using the indicated parameters, the fittings shall have physical characteristics conforming to the requirements given in Table 8.

TABLE 8 : Physical Characteristics of Fittings

Property	Units	Requirements	Test Parameters	Test Method
Thermal Stability	Minutes	> 20	200 °C (1)	ISO TR 10837

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Property	Units	Requirements	Test Parameters	Test Method
Melt Mass-flow Rate (MFR)	g/10 min	0.2 ≤ MFR ≤ 1.4 and after processing maximum deviation of ± 20% of the value measured on the batch compound	Condition 18	ISO 4440.1

(1) Test may be carried out at 210 °C providing that there is a clear correlation to the results at 200 °C, in case of dispute the reference temperature shall be 200 °C.

8.3 **Technical File**

The manufacturer of the fittings shall make availability of a technical file (generally confidential) with all relevant data to prove the conformity of the fittings to this specification. It shall include all results of the type testing and shall conform to the specification relevant technical brochure (e.g. ISO 12093 for electro fusion fittings).

The technical description of the manufacturer shall include the following information:

1. Field of appliance (pipe and fitting temperature limits SDR's and out of roundness):
2. Assembly instructions:
3. Fusion instruction (fusion parameters with limits)
4. For saddles and tapping tee:

   - The means of attachment (tools and/ or under clamp).
   - The need to maintain the under clamp in position in order to ensure the performances of the assembly.

For electrofusion fitting, the format of the technical brochure shall conform to ISO DIS 12093.

In the event of modification of the fusion parameters, the manufacturer shall ensure that the joint conforms to this standard.

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9. MARKING

Following information shall be embossed upto height of 0.15 mm onto the fitting and also in the form of bar code:

a) The manufacturer's identity
b) The size of the fitting in mm
c) Material and Designation
d) The date of manufacturer (code may be used)
e) Fusion time in seconds
f) Cooling time in minutes
g) Fusion parameters in BAR code
h) Lot Number.

The information may be printed on a label associated with the fitting.

10 . PACKING

The fittings shall be packaged in bulk or individually protected where necessary in order to prevent deterioration. Whenever possible, they shall be placed in airtight plastic bags in card board boxes or cartons.

The cartons and/or individual bags shall bear at least one label with the manufacturer's name, date of manufacturer, type and dimensions of the part, number of units in the box, and any special storage conditions and storage time limits.

Note:

All the fittings required shall be bar coded electrofusion fitting type. In case bidder is quoting for spigot fittings, the necessary electrofusion coupler for all non electrofusion ends shall be included in the complete package

The transition fittings shall also be bar coded electrofusion type for PE connection, NPT Female threading confirming to ANSI B 20.1 for G.I connection & butt welded for carbon steel end.

The carbon steel material of transition fittings shall be confirming to APL 5L x 42 and thickness shall be of 4.8 mm.

All the fittings shall be used for the network operating at 4.0 Bar(g) Pressure.

TECHNICAL SPECIFICATION

FOR POLYETHYLENE

PIPES

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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C O N T E N T S

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2.0	INSTRUCTION TO THE TENDERER	2

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1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Polyethylene Pipes used for supply of natural gas.

2.0 INSTRUCTION TO THE TENDERER

2.1 The PE pipes are to be supplied as per IS:14885.

2.2 The length of the Pipes and their supply will be as per following :-

- 20mm OD – In each Coils of 100 mtrs. length
- 32mm OD – In each Coils of 100 mtrs. length
- 63mm OD – In each Coils of 100 mtrs. Length
- 90mm OD – In each Coils of 50 mtrs, Length
- 125mm OD – In each Coils of 12 mtrs. length

2.3 PROTECTION

i) The ends shall be protected by proper end caps to prevent from shocks and ingress of the foreign body.

ii) Coils shall be covered by black PVC/ PE Film to prevent exposure to direct sun light.

2.4 The successful bidder shall submit following for approval of Purchaser/ Consultant after placement of order

a) The Quality Assurance Plan (QAP & Sampling Plan)

b) Certified test result of PE Compound (clause 5 of IS:14885)

c) Performance Requirements (clause 8 of IS:14885)

d) Type Test (clause 9.1.2 of IS:14885).

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2.5 The bidder shall submit following documents at the time of bidding,

a) BIS/ ISO Certification if obtained already, or documentary evidence of applying for the same

b) List of current orders in hand for similar items with full details such as specification, name of purchaser etc.

c) Details of the largest supply executed

d) Name and address of proposed test laboratories alongwith their credentials/ past records for carrying out all required tests.

e) The names of standards/ codes being followed in manufacture and supply

f) Any accreditation certificates obtained or applied for.

2.6 **MARKING**

The pipe shall be marked in continues length in addition to the requirement of the applicable code.

TECHNICAL SPECIFICATION

FOR

ISOLATION VALVES

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
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West Bengal, India.

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Item	:	PE BALL VALVE
Application	:	Natural Gas Distribution Services
Code	:	ASME B16.40 **/** EN 1555-4
Rating	:	PE100 SDR 11
Operating Pressure	:	6 bar (g)
Operating Temperature	:	0°C to 60°C
End Connection	:	PE materials (Spigot Type)
Stem Extension	:	Not Required
Valve Design	:	Full Bore
Ball position Indicator	**:**	Open/Close Limits required

INSPECTION / DOCUMENT

i) Inspection shall be carried out as per client/consultant's approved Inspection Plan / QAP.

ii) Third party inspection agency appointed by vendor on prior approval of owner shall carry out stage wise inspection during manufacturing / final inspection.

iii) Vendor shall furnish all the material test certificates, proof of approval /licence from specified authority as per specified standard, if relevant, internal test / inspection reports as per owner Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

PACKING Packing size to be mentioned to ensure uniformity in delivery condition of the material being procured. Bidder shall submit the packaging details during QAP and also compiled with at the time delivery

TECHNICAL SPECIFICATION

FOR

GI PIPES

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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TECHNICAL SPECIFICATION FOR GI PIPES

Service	:	Natural Gas
Working Pressure	:	4 bar (g)
Hydrostatic Test Pressure	:	6 bar (g)
Working Temperature	:	0°C to 50°C
Material Description	:	IS:1239 (Part-I) Heavy Duty, Continuous Welded
Min. Tensile Strength	:	30 kgf/sq.mm
Min. Elongation	:	6%
Tolerance	:	+ Not limited, - 10%
Protective Coating	:	Galvanised uniformly to protect from corrosion as per IS:4736/ ASTM A53 or by Electro Galvanising
Ends of Pipes	:	Plain End
Inspection	:	Inspection shall be carried out as per applicable code & approved QAP and 100% Pressure Testing shall be carried out at factory.

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1.0 **GENERAL NOTES**

1.1 All pipes and their dimensions, tolerance, chemical composition, physical properties, heat treatment, hydrotest and other testing and marking shall conform to the codes and standards.

1.2 Material test certificates (physical property chemical composition & heat treatment report) shall also be furnished for the pipes supplied.

1.3 All pipes shall be supplied with length between 5 to 7 mtr but average length of pipes supplied shall not be less than 6 meter. Overall length tolerance shall be (–) zero and (+) one length to complete the ordered quantity.

1.3 Pipes shall be galvanised uniformly to protect from corrosion as per IS:4736 / ASTM A53 or by electro galvanising.

2.0 **MARKING AND DESPATCH**

2.1 All pipes shall be marked in accordance with the IS 1239 codes, standards and specifications.

2.2 Paint or ink for marking shall not contain any harmful metal or metallic salts, such as zinc lead or copper which causes corrosive attack in heat.

2.3 Pipes shall be dry, clean and free from moisture, dirt and loose foreign materials of any kind.

2.4 Pipes shall be protected from rust, corrosion and mechanical damage during transportation, shipment and storage.

2.5 Both ends of the pipe shall be protected with the following material.

Plain End	:	Plastic Cap
Bevel End	:	Wood, Metal or Plastic Cover
Threaded End	:	Metal or Plastic Threaded Cap

TECHNICAL SPECIFICATION

FOR

COPPER TUBES

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

BRIDGE AND ROOF CO. (I) LTD.	STANDARD TECHNICAL SPECIFICATION		
		DOCUMENT NO.	Page 1 of 7
TITLE	SEAMLESS ROUND COPPER TUBES	BR/TS/006	REVISION : A
			EDITION : 1

STANDARD TECHNICAL SPECIFICATION FOR SEAMLESS ROUND COPPER TUBES

SPECIFICATION NO.: BR/TS/006

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :

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1.0 SCOPE

This specification covers the requirements for Seamless Round Copper Tubes. Specific requirement of Copper Tubes shall be 12 mm OD X 0.6 mm WT, Half Hard, with Physical properties to ensure wrinkle free bend-ability. Unless modified by this specification, requirement of BS EN 1057:2006 shall prevail.

2.0 MATERIAL

The material used for the manufacturer of Copper tube shall conform to BS EN 1057:2006, Grade Cu – DHP or CW024A or ASTM C 12200.

Each lot of copper tubes shall be tested in accordance with BS EN: 1057 to ensure the following properties.

a. Mechanical Properties:

i. Ultimate Tensile Strength – 250 N/ sq.mm (min)

ii. Elongation – 30% (min)

iii. Hardness - 75 to 100 on HV scale.

b. Chemical Properties:

Copper Percentage including silver (Cu+Ag): Min 99.9%

Phosphorus Percentage (P): 0.015 to 0.040%

3.0 DIMENSIONAL TOLERANCES:

The mean Outside Diameter of the tube shall not vary from the specified outside diameter of 12 mm by more than ±0.0 9 mm. And also wall thickness of the tube shall not vary by more than ±0.06 mm of specified wall thickness of 0.6 mm.

Copper Tubes shall be supplied in cut lengths of 3.0m

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4.0 PROCESS OF MANUFACTURE:

The tubes shall be solid drawn by the process of melting, extrusion and thereafter Bright annealing. The ends shal be cut clean & square with the axis of the tube in no case shall tubes be redrawn from old or used tubes.

5.0 INSPECTION AND TESTING:

Inspection shall be carried out as per design codes/standards, Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.

Even after third party inspection, Client reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. If the results of these tests fall out side the limits specified in Technical specification, then client reserves the rights to reject all production supplied from the batch.

a. FREEDOM FROM DEFECT TEST

The tubes shall be free from internal & external fins, flaws, skin defects, blow holes etc. or other irregularities which might restrict the free flow of fluid and shall be so designed that resistance to the flow of fluid through the tubes is minimized.

All the tubes shall be subject to one the following tests:

i) **Eddy Current Test:** Tubes shall be Eddy Current tested as per Annex. C of BS EN 1057 an d ASTM E243. Eddy Current te sting is a computer aided test, wherein the tube passes through a probe & an electro- magnetic field is created around the peripheral of the tube to detect any flaw or blow hole which may not be visible to the naked eye. The manufacturer must have in-house Eddy Current testing facilities to supply to IGL . IGL reserve s th e right to witness the Eddy Current facility at the manufacturer's factory premises

ii) **Hydrostatic Test:** Hydrostatic test shall be carried out minimum 35 bar pressure for a period of 10 second as per BS EN 1057.

iii) **Pneumatic Test:** The tube under test shall b e connected to pressurized air. Air pressure of 4 bar shall be maintained in the tube. The tube shall be completely immersed in water for a minimum period of 10 sec. and inspected for the issue of bubbles from the tube. Tube shall be rejected in case of occurance of bubble, otherwise accepted.

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b. CARBON CONTENT TEST

Copper tubes to be tested for carbon content test to ensure a carbon level to avoid the formation of carbon film during installation. Max. Carbon level shall be permitted as per Table-6 of BS EN 1057. Test shall be carried out as pe rreference method described in EN 723.

Sampling frequency shall be at least one sample per 5 Km of tube length. However, for small order quantities/ each batch of production, atleast one sample shall be drawn.

c. CARBON FILM TEST

The detection and assessment of carbon film shall be carried out as per Annex. B of BS EN 1057. Sampling for this test shall be same as that for 5.0 (b) of this specification.

6.0 RETEST:

In case a sample fails to meet the test requirements of this specification, the whole batch of production represented by the sample shall be kept aside for further test.

Four times the number of samples as sampling criteria defined in 5. 0 (b) shall be taken from that batch for the specific test, for which the earlier sample failed, for further testing. If any of these samples fail to meet the test requirements, whole batch shall be rejected. And if, all the samples pass the test, that batch of production shall be accepted.

7.0 MARKING:

Each tube shall be permanently marked every meter with Client's Logo, manufactures name, size (ODXWT) and specification (BS EN 1057) of the tube.

Each packing con taining tubes sh all carry the following, stamped or written in indelible ink.

a) Manufacturers name or trade mark ,
b) Designation of tubes (OD x wall thk)
c) Lot number.

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d) No. of the standard (EN 1057)

8.0 PACKAGING:

Packing size shall be ensured for uniformity in de livery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

9.0 DOCUMENTATION:

(i) Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per Technical Specification, at the time of final inspection of each supply lot of material.

(ii) Vendor shall prepare and submit the detail drawings of required Copper Tubes and QAP for approval by Client/ consultant before starting production.

(iii) For any control test or examination required under the supervision of TPIA/owner/ owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

BRIDGE AND ROOF CO. (INDIA) LTD.	QAP Copper Tubes				QAP NO. BR/QAP/001 Sheet 1 Prepared : Checked: Approved :			
						INSPECTION		
Sr. No.	**INSPECTION AND TESTING**	**QUANTUM OF CHECK**	**PROCEDURE**	**ACCEPTANCE CRITERIA AND CERTIFICATE**	**FORMAT OF RECORD**	**Vendor**	**TPIA**	**PMC/ Client**	**REMARKS**
1	Metallic materials (Chemical & Physical Requirements-Composition, Tensile & Hardness)	As per Sampling Plan in TS	As per BS EN 1057:2007	Clause 2.0 (a) & (b) of Technical Specificaton	Material Test certificate type 3.1	P	W	R	
2	Freedom From Defects Test One of the following three tests shall be performed :								
2.1	Eddy Current Test	100%	As per BS EN 1057:2007 and Technical Specification	As per BS EN 1057:2007 and Technical Specification	INSPECTION TEST REPORT	P	W	R	
2.2	Hydrostatic Test	100%	As per BS EN 1057:2007 and Technical Specification	As per BS EN 1057:2007 and Technical Specification	INSPECTION TEST REPORT	P	W	R	
2.3	Pneumatic Test	100%	As per BS EN 1057:2007 and Technical Specification	As per BS EN 1057:2007 and Technical Specification	INSPECTION TEST REPORT	P	W	R	
3	Surface Quality Test One of the following two tests shall be performed :								
3.1	Carbon Content Test	As per Sampling Plan in TS	As per BS EN 1057:2007 and Technical Specification	As per BS EN 1057:2007 and Technical Specification	INSPECTION TEST REPORT	P	W	R	
3.2	**Carbon Film Test**	**As per Sampling Plan in TS**	As per BS EN 1057:2007 and Technical Specification	As per BS EN 1057:2007 and Technical Specification	**INSPECTION TEST REPORT**	**P**	**W**	**R**	
4	Visual	1%	--	As per BS EN 1057:2007 and Technical Specification	--	P	W	R	
5	Dimensional	1%	--	As per BS EN 1057:2007 and Technical Specification	--	P	W	R	
6	Marking	100%	As per Technical Specification		INSPECTION TEST REPORT	P	W	R	
7	Packaging		As per Technical Specification		INSPECTION TEST REPORT	P	R	R	
8	Final Documentation		Document pertaining to all tests specified in this QAP	Document pertaining to all tests specified in this QAP	EN 10204 3.1 Certifacte	P	H	H	

LEGENDS: R - REVIEW, W - Witness, H-Hold, P - Perform, TPIA - Third Party Agency
(Owner / Owner's Representative)

Note:-

1 The Above Testing and acceptance criteria are mimimum reuirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per TS and Design Standard.

2 The supplier shall submit their own details ITP prepared on the basis of above/ Technical specification for approval of Owner/Owner's representative.

3 Owner/Owner representative shall review/approve all the documents related to ITP/Quality manuls/Drawings etc. submitted by supplier.

4 Contractor shall in coordination with Supplier/Sub vendor issue detailed Production and Inspection schedule indicating the dates and the location to facilitate Owner/Owner's representative and TPIA to organize Inspection.

6 Owner / Owner's representative including TPIA will have to right to inspect any activity of manufacturing at any time

7 All reference Codes/ Standrds, Documents. P.O. Copies shall be arranged by vendor / Supplier for reference of TPIA/PMC/CLIENT at the time of Inspection

8 At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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TECHNICAL SPECIFICATION

FOR

GI FITTINGS

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
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STANDARD TECHNICAL SPECIFICATION FOR GI FITTINGS

SPECIFICATION NO.: BR/TS/007

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :

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1.0 SCOPE

This specification covers the requirements for Malleable Cast Iron Fittings. Unless modified by this specification, requirements of IS 1879 – latest edition shall be valid.

2.0 MATERIAL

The material used for the manufacturing of GI fittings shall conform to IS 14329 – 1995 with latest amendments Grade BM 300. Relevant test certificates conforming to all the test agreements of IS 14329 shall be provided with fittings.

3.0 DIMENSIONS AND DIMENSIONAL TOLERANCES

1. Dimensions of various types of fittings shall be as specified in sections 2 to 10 of IS 1879 – 1987 with latest amendments, as applicable.

2. Wall thickness of fittings and tolerances on them shall be as given in Table 1.2 of IS 1879 – 1987 with latest amendments,

3. In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.

4. All GI fittings shall be of reinforced type. Reinforcement shall be provided as per Table 1.2 of IS: 1879.

4.0 WEIGHT

Weights of various types of fittings shall be as specified in sections 2 to 10 of IS 1879 – 1987 with latest amendments, as applicable.

5.0 THREADS

1. Threads shall be NPT type and conforming to ASME B1.20.1.

2. Outlets of fittings shall be threaded to dimensions & the tolerances as specified in ASME B1.20.1.

3. All internal & external threads shall be tapered.

4. For checking conformity of threads gauging practice in accordance with ASME B1.20.1 shall be followed.

5. Chamfering: The outlet of fittings shall have chamfer.

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6.0 FREEDOM FROM DEFECTS

On visual examination, the outside & inside surfaces of fittings shall be smooth & free from any defects such as cracks, injurious flaws, fine sand depth etc.

7.0 GALVANIZING

i. Fittings shall be galvanized to meet the requirement of IS: 4759 – 1996 with latest amendments.

ii. Zinc conforming to any grade specified in IS: 13229-1991 with latest amendments shall be used for the purpose of galvanizing.

iii. Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.

iv. Coating requirements: Mass of coating shall be 610 - 700 g/m2.

v. Freedom from defect: The zinc coating shall be uniform adhered, reasonably smooth & free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits & blisters.

vi. **Sampling plan and testing for Galvanization**:

   a. All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be given in Table 2 of IS 4759 – latest edition.

   b. The sample selected according to Column 1 & 2 of Table 2, IS: 4759 – latest edition shall be tested for visual requirements as per Clause 6.2 of IS:4759 – latest edition

   c. The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 9.2 of IS: 4759 – latest edition.

vii. Criteria for conformity: As per Clause 8.3 of IS: 4759-latest edition.

viii. Test procedure shall be as per Clause 9 of IS: 4759-latest edition.

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8.0 PRESSURE TEST

Vendor shall carry out pneumatic pressure test as per Clause 12.1b of IS:1879 – 1987 with latest amendments on each & every fittings. Vendor has to submit the Internal Quality control certificate for the same.

9.0 COMPRESSION TEST

This test shall be conducted to judge the malleability of the pipe fittings & shall be carried out as per Clause 13 of IS:1879 – 1987 with latest amendments.

10.0 SAMPLING

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per Appendix-B of IS 1879 – 1987 with latest amendments. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

11.0 MARKING

1. Each fitting shall be embossed with Client's logo, manufacturer's name or trademark and the size designation to the extent possible depending upon available space. Detailed marking arrangement shall be submitted by vendor for approval.

2. Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

3. Manufacturer's name or trade mark.

4. Designation of fittings.

5. Lot number.

6. Each fitting conforming to this standard shall also be marked with BIS standard mark.

12.0 PACKAGING

Packing size is to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

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13.0 INSPECTION / DOCUMENTS

1. Inspection shall be carried out as per Owner Technical Specification/ referred codes.

2. Owner Representative/ Consultant or Third Party Inspection Agency appointed by Owner shall carry out inspection during manufacturing / final inspection.
3. Vendor shall furnish all the material test certificates, proof of approval / licence from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Technical Specification & specified code for 100% material, at the time of final inspection of each supply lot of material.

4. Even after third party inspection, Owner reserves the rights to select a sample of fittings randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the rights to reject all production supplied from the batch.

BRIDGE AND ROOF CO. (INDIA) LTD.	QAP GI FITTINGS	QAP NO. BR/QAP/002 Sheet 1 Prepared : Checked: Approved :

Sr. No.	INSPECTION AND TESTING	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	INSPECTION			
						Vendor	TPIA	PMC	REMARKS
1	Materials (Chemical Properties)	IS:14329	IS:14329	IS:14329	Material Test certificate	P	R	R	
2	Materials (Mechanical Properties)	IS:14329	IS:14329	IS:14329	Material Test certificate	P	R	R	
3	Galvanizing								
3a	Visual inspection (Free from defects)	As per IS 4759-1996	As per IS 4759-1996	As per IS 4759-1996	INSPECTION TEST REPORT	P	W	R	
3b	Mass of Zinc Coating	As per IS 4759-1996	As per IS 4759-1996	As per IS 4759-1996	INSPECTION TEST REPORT	P	W	R	
4	Pneumatic Pressure Test	As per TS	As per IS 1879-1987	As per IS 1879-1987	INSPECTION TEST REPORT	P	W	R	
5	Compression Test	As per TS	As per IS 1879-1987	As per IS 1879-1987	INSPECTION TEST REPORT	P	W	R	
6	Weight of the Fittings	As per TS	As per IS 1879-1987	As per IS 1879-1987	INSPECTION TEST REPORT	P	W	R	
7	Dimension tolerances (Min. length of engagement. OD. Wall thk.)	1%	As per IS 1879-1987	As per IS 1879-1987	INSPECTION TEST REPORT	P	W	R	
8	Marking	1%	As per IS 1879-1987	As per IS 1879-1987	INSPECTION TEST REPORT	P	W	R	
9	Final Documentation		Document pertaining to all tests specified in this QAP	Document pertaining to all tests specified in this QAP		P	H	R	

LEGENDS: R - REVIEW, W - Witness, H-Hold, P - Perform, TPIA - Third Party Agency
(Owner / Owner's Representative)

Note:-

1 The Above Testing and acceptance criteria are mimimum reuirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per TS.

2 The supplier shall submit their own details ITP prepared on the basis of above/ Technical specification for approval of Owner/Owner's representative.

3 Owner/Owner representative shall review/approve all the documents related to ITP/Quality manuls/Drawings etc. submitted by supplier.

4 Owner / Owner's representative including TPIA will have to right to inspect any activity of manufacturing at any time

5 All reference Codes/ Standrds, Documents. P.O. Copies shall be arranged by vendor / Supplier for reference of TPIA/PMC/Client at the time of Inspection

6 At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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TECHNICAL SPECIFICATION

FOR COPPER

FITTINGS

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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1.0 SCOPE

This specification covers the requirements for Copper Capillary fittings (End feed). Unless modified by this specification requirement European EN 1254 Part-I shall be valid.

2.0 MATERIAL

i) The material used for the manufacturer of Copper Capillary Fittings shall confirm to BS EN 1254 - 1: latest Half hard

ii) Material used for the solder should conform to BS 219 & BS EN 29453 or equivalent and should be lead free.

3.0 DIMENSIONAL TOLERANCES

Dimensions tolerances of various types of copper capillary fittings (End feed) shall be as per BS 864 Part-2 (latest) & EN 1254 (Open tolerances on dimensions shall be +/-0.1 mm).

The tolerances as specified in EN 1254 in nominal diameter are as follows (Ref Table 2).

Nominal Diameter	Tolerance on the mean diameter with respect to the nominal diameter		Resulting Difference	Diametrical
D	Outside Dia of male end (mm)	Inside Dia of Socket (mm)	Max. (mm)	Min. (mm)
12 mm	+ .0.04 – .0.05	+ 0.15 – 0.06	0.20	0.02

The minimum wall thickness of a fitting shall be in accordance as given below (Ref. Table 5 of EN 1254).

Nominal Dia mm D	Minimum wall thickness (mm) Wrought Coppers
12	0.6

End connection of the Fitting must be capable of end feeding. Internal solder ring type fitting is not acceptable

4.0 CARBON IN BORE

The internal surface of copper capillary fittings for soldering or brazing shall not contain any detrimental film nor present a carbon level high enough to allow the formation of such a film during installation. The maximum total carbon level on internal surfaces shall not exceed 1.0 mg/dm2 when tested in accordance with the specification.

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5.0 CHEMICAL PROPERTIES

Each heat no. of the copper fitting will be tested for chemical properties to conform to non-arsenical copper DHP grade C 106 as per BS EN 1057 & BS 2871 to have the following chemical composition :

Copper Percentage : Min 99.9%

Phosphorus Percentage : 0.015 to 0.040%

6.0 FREEDOM FROM DEFECTS

The fittings shall be free from internal fins, blow holes, skin defects etc. or other irregularities which might restrict the free flow of fluid, and shall be designed that resistance to the flow of fluid through the fittings is minimized.

7.0 PRESSURE TEST

All fittings shall be leak tested at the option of BGL at a pressure of 1 bar (g) for a period of 2 minutes and no leakage is permitted during this period Manufacturer's Test Certificate is necessary with supply.

STRESS CORROESION RESISTANCE TEST

A Stress Corrosion Resistance is to be carried out as per method defined in ISO 6957 using test solution of pH 9.5 but without pickling

8.0 MARKING

Each tube shall be embossed with manufacturers name or trade mark BS 864 or EN 1254. Each packing containing fittings shall carry the following stamped or written in indelible ink.

a) Manufacturers name or trade mark

b) Designation of tubes

c) BS Symbol mentioning as 864 or EN 1254 to be used.

9.0 INSPECTION / DOCUMENTS

i) Inspect shall be carried out as per Client's Technical Specification and Inspection Plan / QAP.

ii) Client representative or third party inspection agency appointed by Client shall carry out stage wise inspection during manufacturing / final inspection.

iii) Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / inspection reports as per Client.

Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

iv) Even after third party inspection, Client reserves the right to Select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in Client Technical specification, then Client reserves the rights to reject all production supplied from the batch.

v) Vendor shall prepare and submit the detail drawing of required copper fittings for approval by Client Before starting production

vi) For any control test the date and place of inspection shall be provided by the vendor in writing to the Owner /Owner representative along with Production Schedule.

STANDARD SPECIFICATION

FOR

BRASS FITTINGS

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
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STANDARD TECHNICAL SPECIFICATION FOR BRASS FITTINGS

SPECIFICATION NO.: BR/TS/009

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :

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AMENDMENT STATUS

Sl. No.	Clause / Paragraph / Annexure / Exhibit / Drawing Amended	Page No.	Rev.	Date	BY		Verified	
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1.0 SCOPE

This specification covers the requirements for Brass Capillary fittings (End feed fittings).

Unless modified by this specification, requirement of EN 1254 Part 1 shall be valid.

2.0 MATERIAL

i) The material used for the manufacturer of Brass Capillary Fittings shall conform to IS 319 Grade-2 or CW 602N as per EN12164.

ii) Material used for the solder should conform to B S EN 2 9453 and should be lead f ree. S older m aterial shall be generally melting within the temperature range 180 ° C to 250 ° C.

iii) Threading on the Brass fittings shall be done as per NPT (ASME 1.20.1).

3.0 DIMENSIONS

I. Dimensions toleran ces of various ty pes of brass capillary f ittings (End feed fittings). shall b e a s p er EN 1254 Part 1 .The to lerances at t he en d sh all b e as per EN 1254 Part I in nominal diameter which are as follows (Ref. table 2)

Diameter	Tolerance on the mean diameter with respect to the nominal diameter		Resulting Diametrical difference	
D	Outside Dia of male end (mm)	Inside Dia of socket (mm)	Max (mm)	Min (mm)
12 mm	+.0.04 -.0.05	+ 0.15 +0.06	0.20 0.0	

The minimum wall thickness of a fitting shall be in accordance as given below (Ref table 5 of EN 1254 Part 1)

Nominal Dia mm, D	Minimum wall thickness (mm) Brass
12	1.1

II. Minimum length of engagement shall be as per table-3 of BS EN 1254-1.

III. Minimum bore area of fittings shall b e corresponding to minimum bore a s per table-4 of BS EN 1254-1

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IV. Tube abutment shall be shown in t he drawing submitted for approval a s per guidelines of BS EN 1254- 1.

4.0 END CONNECTION

End connection of the fitting must be capable of end feeding to the NPT x 12 mm. Integral solder ring type fitting is not acceptable.

5.0 CHEMICAL PROPERTIES

Chemical composition & mechanical properties of Brass shall be as mentioned in IS:319 Grade-2/ CuZn36Pb2As or CW602N as per EN12164. The material shall be Dezincification-resistant.

6.0 CARBON IN BORE

The internal surface of brass capillary fittings for soldering or brazing shall not contain any detrimental film nor present a carbon level high enough to allow the formation of such a film during installation. The maximum to tal carbon level on inte rnal surfa ces shall not exceed 1.0 mg/dm2. The test shall be carried out as per clause no. 5.4 an d Annexure- A of EN 1254 -1.

7.0 RESISTANCE TO DEZINCIFICATION

The fittings shall be manufactured from alloys containing more than 10% Zinc. Accordingly resistance to dezincification test shall be carried out as p er Cl. 5.5 of E N 1254 -1. The acceptance criteria shall be as per Clause 4.5.3.

8.0 STRESS CORROSION RESISTANCE TEST

A stress cor rosion resistance is to be carried out on fittings as per method defined in ISO 6957 using test solution of pH 9.5 but without pickling.

9.0 FREEDOM FROM DEFECT

The fittings shall be free from internal fins, blow holes, skin defects etc. or other irregularities which might restrict the free flow of fluid, and shall be designed that resistance to the flow of fluid through the fittings is minimized.

10.0 HYDROSTATIC PRESSURE TEST

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All fittings shall be leak tightness tested at 1.5x25 bars for a period of 15 minutes and no leakage is permitted. This test shall be performed on each size of the fittings.

11.0 PNEUMATIC PRESSURE TEST

All fittings shall be leak tested at 6 bars for a period of 10 seconds and no leakage is permitted.

12.0 MARKING

Each fittings shall be embossed with client's logo, manufacturers name and trade mark EN 1 254 Part – I and designation of fittings. Each packing containing fittings shall carry the following stamped or written in indelible ink.

a) Manufacturer's name or trade mark.

b) Designation of fittings.

c) Month and year of manufacturing

13.0 PACKAGING

Packing size to be mentioned to the ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

14.0 INSPECTION / DOCUMENTS

(i) Inspection shall be carried out as per design codes/standards, Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.

(ii) Client's representative or third party in spection agency appointed by client/ vendor shall carry out random inspection during manufacturing/ final inspection.

(iii) Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per Technical Specification, at the time of final inspection of each supply lot of material.

(iv) Even after third party inspection, Client reserves the right to select a sample of

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tube randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in Technical specification, then client reserves the rights to reject all p oduction supplied from the batch.

(v) Vendor shall prepare and submit the detail drawings of required brass fittings and QAP for approval by Client/ consultant before starting production.

(vi) For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be in formed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

BRIDGE AND ROOF CO. (INDIA) LTD.			QAP BRASS FITTINGS			QAP NO. BR/QAP/003 Sheet 1 Prepared : Checked: Approved :			
						INSPECTION			
Sr. No.	**INSPECTION AND TESTING**	**QUANTUM OF CHECK**	**PROCEDURE**	**ACCEPTANCE CRITERIA AND CERTIFICATE**	**FORMAT OF RECORD**	**Vendor**	**TPIA**	**PMC/ Client**	**REMARKS**
1	Raw Material Testing:								
1.1	Metallic materials (Chemical / Physical Requirement)	One sample in each heat	As per EN12164 for Gr. CW602N/ IS:319 Gr. 2)	As per EN12164 for Gr. CW602N/ IS:319 Gr. 2)	Material Test certificate type 3.1	P	R	R	
2	Leak tightness under Internal Hydrostatic Pressure Test	1%	BS EN 1254-1	BS EN 1254-1	INSPECTION TEST REPORT	P	W	R	
3	Gas Tightness Test (Pneumatic test)	1%	BS EN 1254-1	BS EN 1254-1	INSPECTION TEST REPORT	P	W	R	
4	Carbon in Bore	1%	BS EN 1254-1	BS EN 1254-1	INSPECTION TEST REPORT	P	W	R	
5	Dezincification Resistance Test	1%	BS EN 1254-1	BS EN 1254-1	INSPECTION TEST REPORT	P	W	R	
6	Stress Corrosion Resistance Test	1%	BS EN 1254-1	BS EN 1254-1	INSPECTION TEST REPORT	P	W	R	
8	Visual inspection (Free from defects)	10%	BS EN 1254-1	BS EN 1254-1	INSPECTION TEST REPORT	P	W	R	
9	Dimension tolerances (Min. length of engagement. OD. Wall thk.)	10%	As per Approved Drawing/ BS EN 1254-1	As per Approved Drawing/ BS EN 1254-1	INSPECTION TEST REPORT	P	W	R	
10	Marking	10%	BS EN 1254-1	BS EN 1254-1	INSPECTION TEST REPORT	P	W	R	
11	Final Documentation		Document pertaining to all tests specified in this QAP	Document pertaining to all tests specified in this QAP	EN 10204 3.1 CERTIFICATES	P	H	H	

LEGENDS: R - REVIEW, W - Witness, H-Hold, P - Perform, TPIA - Third Party Agency
(Owner / Owner's Representative)

Note:-

1 The Above Testing and acceptance criteria are mimimum reuirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per TS.

2 The supplier shall submit their own details ITP prepared on the basis of above/ Technical specification for approval of Owner/Owner's representative.

3 Owner/Owner representative shall review/approve all the documents related to ITP/Quality manuls/Drawings etc. submitted by supplier.

4 Contractor shall in coordination with Supplier/Sub vendor issue detailed Production and Inspection schedule indicating the dates and the location to facilitate Owner/Owner's representative and TPIA to organize Inspection.

6 Owner / Owner's representative including TPIA will have to right to inspect any activity of manufacturing at any time

7 All reference Codes/ Standrds, Documents. P.O. Copies shall be arranged by vendor / Supplier for reference of TPIA/PMC/CLIENT at the time of Inspection

8 At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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TECHNICAL SPECIFICATION

FOR

ISOLATION & APPLIANCE BALL VALVES

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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Contents of TS No. BR/TS/010

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1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Isolation & Appliance Ball Valves used for supply of natural gas.

2.0 SCOPE OF WORK

2.1 The scope of the tenderer will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of Isolation & Appliance Ball Valves, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in ASME B16.33 and should be approved by any certified agency for Gas application.

2.2 All codes and standards for manufacture, testing, inspection etc. shall be of latest edition.

3.0 MATERIAL SPECIFICATION

3.1 Metallic parts of Valves shall be manufactured as per material specified in respective datasheets.

3.2 Lubricants and Sealants. Lubricants and/or sealants shall be resistant to the action of fuel gases such as natural, manufactured, and LP gases. The valve manufacturer is responsible for the selection of lubricants and sealants, and for the determination of their suitability for the service conditions specified in the scope of this Standard.

3.3 Seating and Stem Seal Materials. The valve manufacturer is responsible for selection of seating and stem seal materials and for determination of their suitability for the service conditions specified in the scope of this Standard.

3.4 Air Aging Tests. Elastomer parts that are exposed to fuel gas shall be made from materials that, following 70-hr air aging in accordance with ASTM D573 at 212°F (100°C), meet elongation, tensile, and hardness property requirements as per ASME B16.33.

3.5 Elastomeric components' material shall qualify swell test and compression set tests as per requirement of ASME B16.33.

4.0 DESIGN AND CONSTRUCTION

4.1 DESIGN QUALIFIACTION: Manufacturer shall qualify the design of the valves as per clauses mentioned below. Relevant documents for establishment of design qualification shall be submitted along with bid.

4.1.1 Each basic valve design shall be qualified and demonstrated as suitable for the service by testing randomly selected production valves of each size, type, and pressure shell material.

4.1.2 Following tests shall be carried out for design qualification as per ASME B 16.33

a) Gas tightness

b) Temperature resistance

c)Structural tests viz. Strength test, Twist test, Bend Test, Tensile Test, Turning Torque test
d) Flow Capacity

4.2 Production Testing
Each Valve shall be tested to a test pressure of 1.5 times the pressure rating of the valve according to test method of gas tightness. No leakage is permitted during production testing.

4.3 Valve ends shall be as specified in respective datasheets.

5.0 Inspection and Testing

5.1 Each valve shall be tested for leakage as specified in cl. 4.2 above. Test certificate shall be provided for production testing.

5.2 Test certificates for physical and chemical properties of all the components of valves shall be provided as per agreed QA/QC requirements.

5.3 Test certificates of all the tests conducted for design qualification as per ASME B16.33 shall be submitted for review.

5.4 Type of inspection documents as per EN 10204 shall be as defined in respective QAP/ Datasheet.

6.0 Packing and Marking

6.1 Valves shall be marked as mentioned below.

6.1.1 The manufacturer's name or trademark and, where space permits, the designation"B16.33." The B16.33 mark is the manufacturer's acknowledgement that the valve was manufactured i n conformance with ASME B16.33.

6.1.2 Pressure Rating.

6.1.3. Open and close indication. when a 1⁄4 turn valve is in the open or closed position (if flat hed, longitudinal axis of the head shall be perpendicular to the longitudinal axis of the valve when valve is in the closed position)

6.2 Each Valve shall be packed in individual card board boxes so as to avoid wear and tear during transport.

6.3 For threaded end valves, end caps shall be provided.

Data Sheet - Isolation Ball Valve		
S.NO	**Description**	**Details**
1	**Process Data**	
1.01	Fluid	Natural Gas
2	**Operating Condition**	
2.01	Pressure	4 Bar (g)
2.02	Temprature (^{o}C)	0-48
3	**Design Condition**	
3.01	Pressure	-
3.02	Temprature (^{o}C)	-29 to 65
4	**Valve Data**	
4.01	Size	1/2" and 3/4"
4.02	Type	Isolation Ball Valve of Full Bore with NPT Female (Confirming to ANSI B1.20.1) as an inlet with operating Knob and locking arrangement with provision for sealing wire and lead seal (without Key).metallic operating Knob for full open/close at 90^{o} position.
4.03	Rating	125#
4.04	End Connections	NPT Female (Confirming to ANSI B1.20.1)
4.05	Body Material	Total Body Including the Nozzle shall be of forged Brass (ASTM B 283, Alloy UNSC37700) with Nickel/ Chrome plated.
4.06	Ball Material	Hard Chrome/ Nickel Plated, ASTM B 283
4.07	Stem	ASTM B283
4.08	Seat	Teflon
4.12	Extension Stem	Not required
4.13	Operator	Butterfly Arrangement
5	**Painiting**	
5.01	Surface Preparation	Not Required
5.02	primer	Not Required
5.03	finish	Not Required
5.04	insulation	Not Required
6	**Test**	
	Production Test	-
6.01	Production Test Pressure	1.5 times of design class pressure
6.02	Test Medium	As per ASME B16.33
6.05	Tes duration	15 seconds
Note	1. Lever type handle not acceptable.	
	2. Minimum Nickel/ Chrome Plated on the ball & body of Isolation ball valve shall be 25 micron	
	3. The above specified tests in TS/ Data sheet are minimum however, the other remaining/ specified test shall be done as per ASME B.16.33	

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Data Sheet - Appliance Ball Valve		
S.NO	**Description**	**Details**
1	**Process Data**	
1.01	Fluid	Natural Gas
2	**Operating Condition**	
2.01	Pressure	4 Bar (g)
2.02	Temprature (^{o}C)	0-48
3	**Design Condition**	
3.01	Pressure	-
3.02	Temprature (^{o}C)	-29 to 65
4	**Valve Data**	
4.01	Size	1/2"
4.02	Type	Appliance Ball Valve of Full Bore with ½" NPT (Confirming to ANSI B1.20.1) Female as an inlet and the outlet shall be having Ni/ Cr plated brass or steel a nozzle (Serrated to suit ¼" rubber tubing/ hose connection) and the material is required for Domestic Natural Gas Service with a metallic operating Knob for full open/close at 90^{0} position.
4.03	Rating	125#
4.04	End Connections	Female as an inlet and the outlet shall be having Ni/ Cr plated brass or steel as nozzle
4.05	Body Material	Total Body Including the Nozzle shall be of forged Brass (ASTM B 283, Alloy UNSC37700) with Nickel/ Chrome plated.
4.06	Ball Material	Hard Chrome/ Nickel Plated, ASTM B 283
4.07	Stem	ASTM B283
4.08	Seat	Teflon
4.12	Extension Stem	Not required
4.13	Operator	Knob Arrangement.
5	**Painiting**	
5.01	Surface Preparation	Not Required
5.02	primer	Not Required
5.03	finish	Not Required
5.04	insulation	Not Required
6	**Test**	
	Production Test	-
6.01	Production Test Pressure	1.5 times of design class pressure
6.02	Test Medium	As per ASME B16.33
6.05	Test duration	15 seconds
Note	1. Minimum Nickel/ Chrome Plated on the ball & body of Isolation ball valve shall be 25 micron	
	2. The above specified tests in TS/ Data sheet are minimum however, the other remaining/ specified test shall be done as per ASME B.16.33	

BRIDGE AND ROOF CO. (INDIA) LTD.			QAP ISOLATION AND APPLIANCE BALL VALVES			QAP NO. BR/QAP/004 Sheet 1 Prepared : Checked: Approved :		
						INSPECTION		
Sr. No.	INSPECTION AND TESTING	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	Vendor	TPIA	REMARKS
1	Raw Material Testing:							
1.1	Matallic materials (Chemical / Physical Requirement)	One in each heat	As per ASTM B 283 (ALLOY UNS C37700)	As per ASTM B 283 (ALLOY UNS C37700)	Material Test certificate	P	R	EN10204-3.1 certificate
1.2	Seat & Stem Seal Material	One in each heat	As per TS/ B16.33	As per TS/ B16.33	Material Test certificate	P	R	EN10204-3.1 certificate
2	Final Product:							
2.1	Gas Tightness Test	1%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	W	
	Twist (Torque) Test	1%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	W	
	Bending Test	1%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	W	
	Tensile Test	One in each heat	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	W	
	Turning Torque Test	1%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	W	
2.2	Temperature Resistance test	1%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	W	
2.3	Flow Capacity Test	1%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	W	
2.4	Production pressure test	100%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	RW	
2.5	Visual inspection (Free from defects)	100%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	RW	
2.6	Dimension tolerances (Min. length of engagement. OD. Wall thk.)	100%	As per Approved Drawing	As per Approved Drawing	INSPECTION TEST REPORT	P	RW	
2.7	Marking	100%	ASME B 16.33	ASME B 16.33	INSPECTION TEST REPORT	P	RW	
3	Final Documentation		Document pertaining to all tests specified in this QAP	Document pertaining to all tests specified in this QAP	EN 10204 3.1 CERTIFICATES for raw material	P	H	

LEGENDS: R - REVIEW, W - Witness, RW - Random Witness (Minimum 0.5% of lot size) H-Hold, P - Perform, TPIA - Third Party Agency, CA- Control Authority (Owner / Owner's Representative)

Note:-

1 The Above Testing and acceptance criteria are mimimum reuirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per TS.

2 The supplier shall submit their own details ITP prepared on the basis of above/ Technical specification for approval of Owner/Owner's representative.

3 Owner/Owner representative shall review/approve all the documents related to ITP/Quality manuls/Drawings etc. submitted by supplier.

4 Contractor shall in coordination with Supplier/Sub vendor issue detailed Production and Inspection schedule indicating the dates and the location to facilitate Owner/Owner's representative and TPIA to organize Inspection.

5 Special manufacturing procedures have to the specially approved or only previously approved procedures have to be used.

6 Owner / Owner's representative including TPIA will have to right to inspect any activity of manufacturing at any time

7 All reference Codes/ Standrds, Documents. P.O. Copies shall be arranged by vendor / Supplier for reference of TPIA/PMC/GAIL(I)at the time of Inspection

8 At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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PROCESS & PIPING DESIGN SECTION

TECHNICAL SPECIFICATION FOR WARNING MATS

SPECIFICATION NO. : BR/TS/011, Rev-1

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SPECIFICATION FOR PE ANTI RODENT WARNING MATS FOR PIPELINE

Purpose	:	For using as a warning sign for Underground Pipeline
Width	:	D + 300 mm, D – Dia of Line Pipe
Thickness	:	1.0 mm thick
Material of the mat	:	The material shall be of high density Polyethylene of virgin quality and non Biodegradable type. It shall have Non Hazardous, Non Toxic and Anti – Rodent properties.
Colour of the mat	:	Golden Yellow with letters printed in RED of non-deletable type with high abrasion resistant.
Art Work	:	A sample piece of 30mm wide and 200mm long of every batch shall be checked by immersing in 20% solution of Ammonium Sulphide for period of 2 weeks at a temperature of 15°C for colour intactness of the strip. Copy of Art work is enclosed at Page 4. **The Art work shall be printed in English and local language alternatively at every 1 mtr distance.**
Mechanical Properties of HDPE		
Tensile Strength	:	Minimum 200 kg/cm^2
Elongation at Break	:	Minimum 175%
Bundle Length	:	1.0 mm thick warning mat shall be supplied as 100 mtrs length in each bundle packed in PE Woven sack material.
Tests	:	Minimum following test has to be done with each batch of warning mat ➢ Tensile Strength test ➢ Elongation test ➢ Impact Strength test ➢ Color fastness test ➢ Heat Stability test ➢ Print Stability test

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- Oxidation Induction test
- ESCR test
- Melt Flow Rate test
- Anti-Rodent Test.
- UV Stabilizer Test
- DSC Scan Test of Raw Material & Finish Goods.

Test Certificates : Vendor has to submit the all test certificates to Purchaser

Inspection : The manufacturer has to submit the QAP before commencement of production. Inspection of the material will be done at vendor‘s works by Client / Consultant Representative. Vendor has to submit all test reports before inspection call. Any test failed during the inspection for the offered lot, the total lot will be rejected.

Documentation : Vendor shall submit all test reports including document regarding Toxicology data & ROHS compliance, documentary evidence regarding Non-biocide product, value of Lethal Dosage (LD), value of % dermal toxicity, details of active ingredient in the product and final inspection reports along with the supply of materials.

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HIGH PRESSURE GAS PIPELINE BELOW

CLIENT NAME

COMPANY NAME

IN EMERGENCY PLEASE CONTACT

PHONE NOS. ……

बी एण्ड आर B AND R Building Nation Since 1926	CONTRACTOR ORDER NO. & DATE SUB-CONTRACTOR ORDER NO. & DATE	**QUALITY ASSURANCE PLAN FOR WARNING MAT**	PROJECT : PACKAGE NO. PACKAGE NAME : ITEM : PE Anti-Rodent Warning Mat

Main Client	:	
Consultants	:	M/S BRIDGE AND ROOF CO.(I) LTD
Contractor	:	
Supplier Name & Address	:	
Supplier P.O. No.	:	
Job No.:	:	
Name of Project	:	
Item Description	:	PE Anti-Rodent Warning Mat.
Specification No.	:	BR/TS/011
Manufacturing Process	:	Extrusion of HDPE Film/ Sheet.
Size Color	: :	D+300 MM Width for steel Pipelines, 300mm width for PE Pipelines, thickness 1mm Golden Yellow Color with Red Text Legend.
TPI Agency	:	Hired and deployed by Package Contractor as per Tender/ PO guidelines

Prepared by Checked by Approved by

QAP No.:		
Page 1 of 5	**DATED:**	REV 0

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बी एण्ड आर B AND R Building Nation Since 1920	CONTRACTOR	QUALITY ASSURANCE PLAN FOR WARNING MAT	PROJECT :
	ORDER NO. & DATE		PACKAGE NO.
	SUB-CONTRACTOR		PACKAGE NAME :
	ORDER NO. & DATE		ITEM : PE Anti-Rodent Warning Mat

Sr No	Name of Test Ref. to Test standards	Type of check / Method	Sampling model for manufacturer	Inspection by Mfr/ Lab.	Acceptance Norms / As per PTS BR/TS/011	Agency				Format of Record	Remarks (If any)
						Mfr.	TPIA	CONTR	PMC / CLIENT		
	Test on Warning Mat :										
1	Dimension & Tolerance: Width & Thickness	Measure ment	Three samples from each lot / batch/Batch	At Mfr's Works	Width : As per PO Thk. : Min. 1mm	P	W	R	R	Test Report	
2	Material Identification by chemical method.	Measure ment	One sample to be tested from each lot / batch.	Performed at any independent Lab.	Test sample shall be tested & to be confirmed HDPE by lab.	W	W	R	R	Test report of independent lab	
3	Color of Mat	Visual	Three sample to be tested from each lot / batch.	At Mfr's Works	Golden yellow color.	W	W	R	R	Test Report	
4	Text legend Printing on Mat	Visual	Three samples from each lot / batch.	At Mfr's Works	Red color. Non deletable and high abrasion resistant (Lamination over printing)	W	W	R	R	Test Report	
5	Tensile strength at break	Measure ment	Three samples to be tested from each lot / batch.	At Mfr's Works	Min 200 kg/cm²	P	W	R	R	Test Report	
6	Elongation at break	Measure ment	Three sample to be tested from each lot / batch.	At Mfr's Works	Min 175 %	P	W	R	R	Test Report	

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Sr No	Name of Test Ref. to Test standards	Type of check / Method	Sampling model for manufacturer	Inspection by Mfr/ Lab.	Acceptance Norms / As per PTS BR/TS/011	Agency				Format of Record	Remarks (If any)
						Mfr.	TPIA	CONTR	PMC / CLIENT		
7	Impact Strength (500gm stricker weight at 1.2 Mtr. Height)	Measurement	Three sample to be tested from each lot / batch	At Mfr's Works	All test samples shall pass. If one fails out of the lot / batch, three more samples to be tested and no failure should occur.	P	W	R	R	Test Report	
8	Color fastness Test: After 15 days at 15°C in 20% Ammonium sulphite solution. (Type Test)	Review of TC	Refer Notes below	Testing at NABL accredited LAB	Satisfactory, while comparing the test specimen with production specimen of that batch in cool light with white background.	P	W*	R	R	Test report	
9	Performance of printing stability	Visual	Three samples from each lot / batch.	At Mfr's Works	Pass. Marking shall be easily legible. Non Deletable.	P	W	R	R	Test Report	
10	Oxidation Induction Test (Type Test)	Review of TC	Refer Notes below	Testing at NABL accredited LAB	Pass .Oxidation Induction test.	R	W*	R	R	Test certificate	
11	ESCR Test (Type Test)	Review of TC	Refer Notes below	Testing at NABL accredited LAB	Pass. No crack found after test.	R	W*	R	R	Test certificate	

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बी एण्ड आर B AND R Building Nation Since 1920	CONTRACTOR ORDER NO. & DATE SUB-CONTRACTOR ORDER NO. & DATE	**QUALITY ASSRANCE PLAN FOR WARNING MAT**	PROJECT : PACKAGE NO. PACKAGE NAME : ITEM : PE Anti-Rodent Warning Mat

Sr No	Name of Test Ref. to Test standards	Type of check / Method	Sampling model	Inspection by Mfr/ Lab.	Acceptance Norms / As per PTS BR/TS/011	Agency				Format of Record	Remarks (If any)
						Mfr.	TPIA	CONTR	PMC / CLIENT		
12	Melt flow Rate (190°C,2.16 kg load) (Type Test)	Measurement	Each lot / batch	Testing at NABL accredited LAB	0.2 – 2.5 Gms / 10 min	P	W*	R	R	Test certificate	
13	Heat Stability (at 80°C for 15 min.) (Type Test)	Measurement	Three samples from each lot / batch.	Testing at NABL accredited LAB	All test samples shall pass. There should be no visual or dimensional changes	P	W*	R	R	Test certificate	
14	Anti-Rodent Test - Non Toxic,Non Hazardous, Non Bio degradable (Type Test)	Review of TC	One sample from each lot / batch.	Testing at NABL accredited LAB	Pass. Anti-Rodent Test. Protection against rodent attack. Document/Certificate issued by supplier for Anti Rodent Master Batch as per PTS - Toxicology data, ROHS Compliance & Non- biocidal	P	W*	R	R	Test certificate	
15	UV stabilizer Test (Type Test)	Review of TC	One sample from each lot / batch.	Testing at NABL accredited LAB	UV content present	P	W*	R	R	Test certificate	

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बी एण्ड आर B AND R Building Nation Since 1920	CONTRACTOR	QUALITY ASSRANCE PLAN FOR WARNING MAT	PROJECT :
	ORDER NO. & DATE		PACKAGE NO.
	SUB-CONTRACTOR		PACKAGE NAME :
	ORDER NO. & DATE		ITEM : PE Anti-Rodent Warning Mat

Sr No	Name of Test Ref. to Test standards	Type of check / Method	Sampling model for manufacturer	Inspection by Mfr/ Lab.	Acceptance Norms / As per PTS BR/TS/011	Agency				Format of Record	Remarks (If any)
						Mfr.	TPIA	CONTR	PMC / CLIENT		
16	DSC Scan with Melting Temperature Tm (Type Test)	Review of TC	One sample from each lot / batch.	Testing at NABL accredited LAB	Tm of Raw Material & corresponding finished product based on DSC Scan image results will have to	P	W*	R	R	T.C.	
17	Identification, Marking Art Work & Packing	Visual	Three sample from each lot / batch.	At Mfr's Works	Client Logo-followed by Client Name, Warning symbols with safety message and Telephone symbol with contact nos in English & local language at defined interval. Lot / batch no. to be printed at minimum 1 mtr interval for identification purpose. Printing shall be done as per approved layout. Roll length 100m minimum.	P	W	R	R	Test Report	

Abbrevations : P= Perform; W=Mandatory Witness; R=Review; T.C.=Test Certificate W*= First time witness and subsequent review for type tests.

Type Testing procedure: Manufacturer shall declare a given lot of Raw Material mix (PE compound, colorant, UV and Anti rodent) weight by assigning a specific lot Number. Manufacturer shall submit the documentation containing weight of individual components to prepare such mix. Manufacturer shall conduct the type testing once for such mix in a NABL lab for all type tests and get the same witnessed by TPIA. If lab does not allow TPI testing as a matter of their policy then such declaration from lab along with type testing results need to be submitted. Manufacturer shall maintain a log book of material consumption of such declared lot and need not carry out type testing until all the material in such lot is consumed. With every inspection waiver request, manufacturer shall provide the updated log book to use the same type test certificates. The updated log book shall be certified by TPIA at the time of final inspection. TPIA has to honor the previously certified log book by different TPI agency.

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TECHNICAL SPECIFICATION

FOR

FLEXIBLE HOSE PIPE
(Anaconda)

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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STANDARD TECHNICAL SPECIFICATION FOR CORRUGATED FLEXIBLE METAL HOSE (ANACONDA)

SPECIFICATION NO.: BR/TS/012

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :

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AMENDMENT STATUS

Sl. No.	Clause / Paragraph / Annexure / Exhibit / Drawing Amended	Page No.	Rev.	Date	BY		Verified	
					Name	Sig.	Name	Sig.

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2.0 SCOPE OF WORKS

3.0 TECHNICAL SPECIFICATIONS

4.0 TESTING, CLEANING & PACKAGING

5.0 MARKING

6.0 PACKAGING

7.0 INSPECTION / DOCUMENTS

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1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of corrugated flexible metal hose used for supply of domestic natural gas.

2.0 SCOPE OF WORKS

The scope of the tender will include manufacture/ supply, inspection, testing, marking, packaging handling and dispatch of corrugated flexible metal hose assembly, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard BS: 6501 Part 1(latest)/ ISO 10380.

All codes and standard for manufacture, testing, inspection etc. shall be of latest edition.

Owner/ Owner's Representative reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 TECHNICAL SPECIFICATIONS

Item	:	Corrugated Flexible metal Hose Assembly (Type-A flexibility) for Natural Gas Service
Applicable Code	:	BS: 6501 Part-I: (latest)/ ISO 10380 Specification for Corrugated Hose Assemblies
Nominal Size	:	DN 12
Total Length of Hose Assembly	:	350mm end to end
Movement Required	:	Static
Medium Flowing through Hose assembly	:	Natural gas (PNG)
Nominal Pressure/Design Pressure	:	0.25 bar (g) at 20°C
Temperature Range	:	0–65°C

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Cyclic Life : 30 Bends minimum when tested in accordance with Cl.14.2 Of BS: 6501 Part-I (latest)/ ISO 10380.

Static Bend Radius : 25mm

Type & Material of End Fitting : ¾" NPT SS316L Female Swivel Nut with Flat Seat Nipple with Rubber Gasket / `O' Ring (and second end shall be SS Male ¾" NPT and threads shall be conforming to ANSI B1.20.1 . Fittings shall be conforming to SS316L.

Note: TIG welding shall be carried out for welding SS fittings to corrugated hose.

Material of rubber gasket : Polymer NBR / nitrile with thickness 3-4 mm

Material of Hose : SS316L, 0.3 mm thickness

Braiding : Not required

Product to be conveyed : Natural Gas

Heat Treatment Requirement : Parent sheet or the finished hose must undergo annealing.The purpose of this is to relieve stress due to cold working.

Surface Coating : No zinc plating is required on SS hose, SS fittings & welded portion. At the welded portion suitable anti rusting provision shall be made. .

4.0 TESTING, CLEANING & PACKAGING

Tests : Pneumatic Test at a pressure of 1.5 kg/cm^2(g) & Type testing as per Cl.Nos. 14.1, 14.2, 14.5 & 14.6 of BS: 6501 Part-I (latest)/ ISO 10380

Cleaning & Packaging : As per Cl.No. 17.0 of BS:6501 Part-I (latest)/ ISO 10380

Test Certificate : As per Cl.No. 18.0 of BS:6501 Part-I (latest)/ ISO 10380

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5.0 MARKING

Each corrugated flexible metal hose and SS316 fittings shall be embossed with owner's logo, manufacturers name or trade mark BS: 6501 part I (latest)/ ISO 10380 and designation of fittings.

Each packing containing corrugated flexible metal hose shall carry the following stamped or written in indelible ink.

- Indication of the source of manufacture/Trade mark/Type
- Designation of fittings
- Maximum working pressure
- Nominal bore
- Month and year of manufacture

6.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details like numbering of pieces per package, along with QAP and also complied with at the time of delivery. One package will consist of one corrugated flexible metal hose assembly (metal hose + end fitting on both sides) & two gaskets for each end.

7.0 INSPECTION / DOCUMENTS

a) Inspection shall be carried out as per design code/standard, Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by Owner/Owner's representative.

b) Owner representative or third party inspection agency appointed by owner shall carry out random inspection during manufacturing/ final inspection.

c) Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

d) Even after third party inspection, owner reserves the right to select a sample of flexible metal hose randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in Technical specification, then owner reserves the rights to reject all production supplied from the batch.

e) For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

f) Vendor shall submit the dimensional drawing for Hose, end fittings and Rubber Gasket along with the technical bid.

BRIDGE AND ROOF CO. (INDIA) LTD.	QAP FLEXIBLE HOSES (ANACONDA)	QAP NO. BR/QAP/006 Sheet 1 Prepared : Checked: Approved :

Sr. No.	INSPECTION AND TESTING	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	INSPECTION			
						Vendor	TPIA	PMC	REMARKS
1	Materials (Chemical Properties)	One sample each heat	Material code	Material code	Material Test certificate	P	R	R	
2	Materials (Mechanical Properties)	One sample each heat	Material code	Material code	Material Test certificate	P	R	R	
3	TIG welding (End fitting to hose)	100%	Approved WPS	ASME Section IX	Welding report	P	R	R	
4	Cyclic Test (Type test)	One sample each lot	As per ISO 10380	As per ISO 10380	INSPECTION TEST REPORT	P	W	R	
5	Pliable Test (Type Test)	One sample each lot	As per ISO 10380	As per ISO 10380	INSPECTION TEST REPORT	P	W	R	
6	Pneumatic test (Production test)	100%	As per Technical specification	As per Technical specification	INSPECTION TEST REPORT	P	W	R	
7	Leakage Test	1%	As per ISO:10380	As per ISO:10380	INSPECTION TEST REPORT	P	W	R	
8	Dimensional Check	1%	-	As per approved Drawing	INSPECTION TEST REPORT	P	W	R	
9	Marking	1%	As per TS	As per TS	INSPECTION TEST REPORT	P	W	R	
10	Final Documentation		Document pertaining to all tests specified in this QAP	Document pertaining to all tests specified in this QAP		P	H	R	

LEGENDS: R - REVIEW, W - Witness, H-Hold, P - Perform, TPIA - Third Party Agency (Owner / Owner's Representative)

Note:-

1 The Above Testing and acceptance criteria are mimimum reuirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per TS.

2 The supplier shall submit their own details ITP prepared on the basis of above/ Technical specification for approval of Owner/Owner's representative.

3 Owner/Owner representative shall review/approve all the documents related to ITP/Quality manuls/Drawings etc. submitted by supplier.

4 Owner / Owner's representative including TPIA will have to right to inspect any activity of manufacturing at any time

5 All reference Codes/ Standrds, Documents. P.O. Copies shall be arranged by vendor / Supplier for reference of TPIA/PMC/Client at the time of Inspection

6 At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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TECHNICAL SPECIFICATION

FOR

FLUX

BRIDGE AND ROOF CO. (INDIA) LTD.
(A Govt. of India Undertaking)
4th & 5th Floor, Kankaria Centre,
2/1 Russell Street, Kolkata-700071,
West Bengal, India.

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TECHNICAL SPECIFICATION FOR FLUX

I) Flux should be Non-Acidic, Lead Free as per ANSI / NSF 6 or equivalent to be approved by EIC.

II) The Flux should be supplied in paste form packed in small tin container of 500 gms. & should have compatibility to use with solder wire (Lead free & as per BS 219 or equivalent).

III) Certificate of confirmation with the specified standard & relevant material test certificate should be furnished by vendor.

IV) Vendor should supply branded material.

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SPECIFICATION FOR

QUALITY ASSURANCE SYSTEMS REQUIREMENTS

SPECIFICATION NO. BR/QA/001

(PROCESS & PIPELINE DESIGN SECTION)

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ATTACHMENTS

TITLE	NUMBER
FORMAT FOR QUALITY PLAN	FORMAT 00001
FORMAT FOR OBSERVATION ON	FORMAT 00002

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1.0 INTRODUCTION

This specification establishes the Quality Assurance Requirements to be met by the sub-contractors (including turnkey Contractors) and their sub-vendors.

In case of any conflict between this specification and other provisions of the contract / purchase order, the same shall be brought to the notice of Consultant, at the stage of bidding and shall be resolved with Consultant, prior to the placement of order.

2.0 DEFINITION

Bidder

For the purpose of this specification, the word "Bi dder" means the person(s), firm, company or organisation who is under the process of being contracted by Consultant / Owner for delivery of some products (including service). The word is considered synonymous to supplier, contractor or vendor.

Correction

Action taken to eliminate the detected non-conformity.

Refers to repair, rework or adjustment and relates to the dis position of an existing non-conformity.

Corrective Action

Action taken to eliminate the causes of an existing non-conformity, defect or other undesirable situation in order to prevent recurrence.

Preventive Action

Action taken to eliminate the causes of a potential non-conformity, defect or other undesirable situation in order to prevent its recurrence.

Process

Set of inter-related resources and activities which transform inputs into outputs.

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Special Process

Processes requiring pre-qualification of their process capability.

3.0 CONTRACTORS SCOPE OF WORK

3.1 Prior to award of contract

The bidder shall understand scope of work, dra wings, specifications and standards etc., attached to the tender/ enquiry document, before he makes an offer.

The bidder shall submit milestone charts hawing the time required for each milestone activity and linkages between different milestone activities alongwith overall time period required to complete the entire scope of work.

The bidder shall develop and submit manpower and resource deployment chart.

The bidder shall submit, alo ngwith the bid, a manual or equivalent document describing/ indicating/ addressing various control/ check points for the purpose of quality assurance and the responsibilities of various functions responsible for quality assurance.

3.2 After the award of contract

The bidder shall submit the schedule for submission of following documents in the kick-off meeting or within two weeks of the placement of order, whichever is earlier.

- Detailed Bar Chart
- Quality pian for all activities, required to be do ne by the bidder, to accomplish offered scope of work.
- Inspection and test plans, covering various control aspects.
- Job procedures as required by Consultant / Owner.
- Procurement schedule for items to be supplied by contractor covering inspection of the same.

Various documents submitted by the bi dder shall be finalised in consultation with Consultant. Here it shall be presumed that ones a bidder has made an offer, he has understood the requirements given in this specification and agrees to

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comply with them in totality unless otherwise categorically so indicated during pre-award stage through agreed deviation/ exception request. All Quality Assurance Plan (QAP) documents shall be reviewed by concerned functional groups of Consultant and the bidder shall be required to incorporate all comments within the framework of this specification at this stage of the contract. It is also obligatory on the part of the bidder that obtains approval on every Quality Assurance Plan (QAP) documents, before he starts using a particular document for deli very of contracted scope of work. Participation of Consultant / Owner in review/ approva I of quality plan/ QAP documents does not absolve the contractor of his contractual obligations towards specified and intended use of the product (or service) provided/ to be provided by him under the contract.

3.3 **During job execution**

During job execution, the bidder shall fully comply with all quality document submitted and finalised/ agreed against the requirements of this specification. Approval of Consultant on all these documents shall be sought be fore start of work.

Bidder shall produce sufficient quality records on controlled/agreed forms suchthat requirements given in this specification are objectively/demonstrable.

Bidder shall facilitate Consultant / Owner during quality/ technical audits at his works/ sites.

Bidder shall discharge all responsibilities towards enforcement of this specification on all his sub-contractors for any part of the scope which is sub-contracted.

4.0 QUALITY ASSURANCE SYSTEM REQUIREMENTS

4.1 The bidder shall nom inate an overall incharge of the contract titled as "Project Manager" for the scope of work of agreed contract. The name of this person shall be duly intimated to Consultant including all subsequent changes, if any. Consultant shall correspond only with the project manager of the bidder on all matters of the project. The project manager of the bidder shall be responsible for co-ordination and management of activities with bidder's organisation and all sub-vendors appointed by the bidder.

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After award of work, the bidder may review augmentation of manpower and resources deployment chart (submitted earlier), detail it out , if so consented by Consultant / Owner and resubmit the same as "issued for effective implementation of the project".

4.2 The bidder shall plan the contract scope of work on quality plan format such that no major variation is expected during delivery of contract scope of work. These quality plan shall be made on enclosed format complete in all respect. The quality plan shall be assumed to be detailing bidder's understanding and planning for the contract/ offered scope of work. The bidder shall plan the type of resources including various work methodology which he agrees to utilize for delivery of contract scope of work.

4.3 The bidder is required to review the contract at all appropriate stages to evaluate his capabilities with respect to timely and quality completion of all activities pertaining to contracted scope of work and shall report for constraints, if any to Consultant / Owner.

4.4 The design activities, if any performed during delivery of contract scope of work shall be so controlled that the outputs is reliable enough. It is expected that during development of design, the bidder shall take recourse to detailed checking, inter departmental reviews and documented verification methods.

4.5 For all doc uments which the bidder is likely to util ise for delivery of contract scope of work, a system must exist which assures that latest/ required version(s) of the document(s) is available at all location/ point of use.

4.6 In case the bidder dec ides to sub-contract any part/ full of the contract scope of work (without prejudice to main Contractual condition), the bidder shall :

- Evaluate the technical and financial capabilities and past performance of the sub-contractor(s) and their prod ucts and/ or services before awarding them with the sub-contracted scope of work. Selection of a sub-contractor should meet Consultant approval in documented form.

- Requirement of this specification shall be enforced on sub-contracted agency also. The bidder shall choose sub-contractor based on their capability to meet requirements of this specification also.

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Note: It may so happen that, in a given situation, a sub-contractor may not have a system meeting the requirements of this specification. In all such eventualities, bidder may lend his system to sub-contractor for the contract such that sub-contractor effectively meets the requirements of this specification. In all such cases Consultant shall be duly informed.

4.7 Bidder sha ll establish adequate methodology such that the materials supplied by the Owner / Consultant shall be adequately preserved, hand led and made use of for the purpose for which they are provided.

4.8 All output delivered against contract scope of work shall be suitably identified in such a manner that either through identification or some other means, sufficient traceability is maintained which permits effective resolution of a ny problem reported in the outputs.

4.9 Critical activities shall be identified and the bidder is required to have documented methodologies which he is going to utilize for carrying out such activities under the contract scope of work. Wherever it is difficult to fully inspect or verify the out put (special process), bidder shall pre -qualify, the performers and methodologies.

4.10 All inspections carried out by the bidder's surveillance/ inspection staff shall be conformity to quality plans and/ or in spection and test plans. All inspection results shall be duly documented on controlled/ agreed forms such that results can be co-related to specific product, that was inspected/ tested.

4.11 All inspection, measuring & test equipments (IMTEs) shall be duly calibrated as per National/ International standards/ codes and only calibrated and certified IMTEs shall be utilized for delivery of contract scope of work.

4.12 All out puts/ products delivered against contract scope of work shall be duly marked such that their inspection status is clearly evident during all stages/ period of the contract.

4.13 All non-conformities (NCs) found by the contractor's inspection/ surveillance staff shall be duly re corded, including their disposa l action. The deficiencies observed during stage of the product, shall be recorded and resolved suitably. Effective corrective and preventive acti on shall be implemented by the bidder for all repetitive NCs, including deficiencies.

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4.14 All deficiencies noticed by Consultant / Owner representati ve(s) shall be recorded on a controlled form (Format No. 00002). Such deficiencies shall be analysed by the bidder and effective and appropriate correction, corrective and preventive actions shall be implemented. Bidder shall intimate Consultant/ Owner of all such corrective and preventive action implemented by him.

4.15 Bidder shall establish appropriate methodologies for safe and effective handling, storage, preservation of various materials/ inputs encountered during delivery of contract scope of work.

4.16 Bidder shall prepare sufficient records for various processes carried out by him for delivery of contract scope of work such that requirements of this specification are objectively demonstrable. In case Consultant/ Owner finds that enough objective evidence/ recording is not a vailable for any particular process, bidder shall be obliged to make additional records so as to provide sufficient objective evidence. The decision of Consultant / Owner shall be final and binding on such issues.

4.17 The bidder shall arrange internal quality audits at quarterly intervals, to independently assess the conformance by various performers to the requirements of this specification. The findings of such assessment shall be duly recorded and a copy shall be sent to Consultant / Owner for review.

4.18 For all special processes, bidder shall deploy only qualified performers. Wherever Consultant / Owner observes any deficiency, the bidder shall arrange the adequate training to the performer(s) before any further delivery of work.

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OBSERVATION OF QUALITY ASPECTS

FORMAT - 00002

<table>
<tr><td colspan="4">Job No. and Description No.
Issued to : M/s Date:</td></tr>
<tr><td colspan="4">Location of Work :
Item of Work :</td></tr>
<tr><td colspan="2">Details of Observation(Deficiency)</td><td colspan="2">Recommended Course of Action

Time Allowed for Correction :</td></tr>
<tr><td colspan="4">Issued by : _____
Name of Signature of RCM, Consultant</td></tr>
<tr><td colspan="4">Corrective Action taken report by Contractor/ Vendor :

Date: Name and Signature</td></tr>
<tr><td colspan="4">Distribution (before resolution) :</td></tr>
<tr><td>Project Manager
Owner</td><td>Chief Business Executive
Consultant</td><td>Client/PMC/
Consultant</td><td>Resident Construction
Manager, Consultant</td></tr>
<tr><td colspan="4">Verification of Resolution by Consultant :

Date: Name of Signature</td></tr>
<tr><td colspan="4">Distribution (before resolution) :</td></tr>
<tr><td>Project Manager
Owner</td><td>Chief Business Executive
Consultant</td><td>Client/PMC/
Consultant</td><td>Resident Construction
Manager, Consultant</td></tr>
</table>

FORMAT – 00001

Bidder's Quality Plan		Project Name :				PO/ Contract Ref:				
General			Performing Functions			Inspection Functions			Audit Function	
Activity Description	Procedure Number	Code of Conformance	Performer	Checker	Reviewer/ Approver	Sampling Plan	Testing and Inspection Code	Type of (Approval) Surveillance	Audit Scope	Owner's/ Consultant Review/ Audit Requirement

Note: 1) The bidder ensures that the filled up format conforms to minimum requirements on Quality Plan/ Quality Assurance, specified by Consultant on drawings/ standards/ specifications/ write-up.
2) The bidder confirms that document is issued for information/ approval of Owner/ Consultant for the project implementation

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TECHNICAL SPECIFICATION OF STEEL REINFORCED RUBBER HOSE

BRIDGE AND ROOF CO. (INDIA) LTD.

(A Govt. of India Undertaking)

4th & 5th Floor, Kankaria Centre,

2/1 Russell Street, Kolkata-700071, West Bengal, India.

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STANDARD TECHNICAL SPECIFICATION FOR STEEL REINFORCED RUBBER HOSE

SPECIFICATION NO.: BR/TS/014

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :

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AMENDMENT STATUS

Sl. No.	Clause / Paragraph / Annexure / Exhibit / Drawing Amended	Page No.	Rev.	Date	BY		Verified	
					Name	Sig.	Name	Sig.

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2.0	MATERIAL
3.0	DIMENSIONS & TOLERANCES
4.0	FEATURES
5.0	MARKING
6.0	PACKAGING
7.0	INSPECTION / DOCUMENTS

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1.0 SCOPE

This present document covers the technical specification for the procurement of steel reinforced rubber hose, Type 4 used in distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for steel reinforced rubber hose unless modified by this specification, requirements of IS: 9573 shall be valid.

2.0 MATERIAL

i. Lining: - It shall be nitrile – butadiene rubber (NBR) or chloroprene rubber (CR) compound. It shall be smooth in bore, uniform in thickness and free from air blisters, porosity and splits.

ii Reinforcement material :- It shall have wire reinforcement in braided form in between the lining & cover.

iii Cover :- It shall be manufactured out of synthetic rubber compound resistant to abrasion,weather and natural gas. The cover color shall be orange.

iv. The whole shall be consolidated by wrapping or any other suitable method anduniformly vulcanized to give good adhesion between reinforcement plies and the rubber lining of the cover.

3.0 DIMENSIONS & TOLERANCES

i. Bore size

Nominal size (mm)	Minimum base diameter (mm)	Minimum bend radius (mm)
8 mm	7.9	95

The Nominal bore size of the hose shall be accordance to table # 1 of IS 9573 : 1998 shall be as given above table. It shall be tested/ checked as method defined in IS 4143

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ii. The Minimum thickness of lining & cover shall be 2 mm & 1 mm respectively.
iii. Length of hose shall be as defined in M.R. & the tolerances on length shall be permitted ± 1%.

4.0 FEATURES

4.1 Mechanical properties

Tensile strength (Lining & cover) at break - 10 MPa (minimum)

Elongation (Lining & cover) in at break (%) - 200 & 250 respectively (minimum)

4.2 Resistance of Lining to n-pentane

The n-pentane absorbed and the n-pentane extractable matter as determined Clause no. 5.4.3.2 of IS 9573: 1998 shall not exceed 10% & 5% respectively to the initial mass of lining.

4.3 Adhesion

The minimum adhesion between rubber lining & reinforcement, between layers of reinforcement and between reinforcement & cover shall be 2KN/m.

4.4 Low temperature flexibility

Flexible hose is conditioned at -40 ° C for at least 5 hrs. and then bent at 180° around a mandrel with a diameter 12 times the nominal bore diameter of the hose, no cracks or breaks shall be shown.

4.5 Flexibility of Hose

The hose shall be capable of being bent empty to the radius 95 mm without flattening and suffering structural damages.

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4.6 Ozone resistance

It shall be carried out as per clause no. 5.5.of IS 9573: 1978

4.7 Hydrostatic test

All hoses shall be leak tightness tested at 2 Mpa for a period of 1 minutes and no leakage is permitted. This test shall be performed on each size of the hoses as per clause no. 5.5.5.1 of IS 9573: 1978.

4.8 Bursting pressure

It shall be carried out as per Clause 5.5.2 of IS 9573. The minimum burst pressure shall be 5 Mpa.

4.9 Grip strength test

The hose shall comply to the requirement of Clause no. 5.5.7 of IS 9573.

4.10 Burning behaviour

The burning test shall be carried out on hose as per clause no. 5.5.8 of IS 9573. The hose at least shall not burn till 45 second.

5.0 MARKING

Each hose shall be indelibly marked as follows:

a) Manufacturer's name or trade mark., if any
b) Nominal bore
c) Batch no. / Lot no.
d) Month and year of manufacturer
e) Type of hose i.e Type 4
f) BIS marking

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6.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

7.0 INSPECTION / DOCUMENTS

i. Inspection shall be carried out as per design codes/standards, Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.

ii. For all tests purposes, the minimum time between vulcanization & testing shall be 16 h.

iii. Owner representative or third party inspection agency appointed by Owner shall carry out random inspection during manufacturing/ final inspection.

iv. Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per Technical Specification, at the time of final inspection of each supply lot of material.

v. Even after third party inspection, Owner reserves the right to select a sample of hose randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in Technical specification, then Owner reserves the rights to reject all production supplied from the batch.

vi. Vendor shall prepare and submit the detail drawings of required steel reinforced rubber hose for approval by Owner before starting production.

vii. For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

BRIDGE AND ROOF CO. (INDIA) LTD.	QAP STEEL REINFORCED RUBBER HOSES	QAP NO. BR/QAP/007 Sheet 1 Prepared : Checked: Approved :

Sr. No.	INSPECTION AND TESTING	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	INSPECTION			
						Vendor	TPIA	PMC	REMARKS
1	Materials (Chemical Properties)	IS :9573	Manufacturer Std	IS :9573	Material Test certificate	P	R	R	
2	Dimensional check	IS : 9573	-	IS :9573	INSPECTION TEST REPORT	P	W	R	
3	Physical Properties (Tensile Strength and Elongation	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
4	Accelerated aging test	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
5	Resistance of lining to N-Pentane	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
6	Adhesion	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
7	Low Temperature Flexibility	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
8	Flexibility	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
9	Ozone Resistance	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
10	Hydrostatic Test	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
11	Bursting Pressure Test	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
12	Grip Strength Test	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
13	Burning Behaviour test	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
14	Marking	IS : 9573	IS : 9573	IS : 9573	INSPECTION TEST REPORT	P	W	R	
15	Final Documentation		Document pertaining to all tests specified in this QAP	Document pertaining to all tests specified in this QAP		P	H	R	

LEGENDS: R - REVIEW, W - Witness, H-Hold, P - Perform, TPIA - Third Party Agency (Owner / Owner's Representative)

Note:-

1 The Above Testing and acceptance criteria are mimimum reuirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per TS.

2 The supplier shall submit their own details ITP prepared on the basis of above/ Technical specification for approval of Owner/Owner's representative.

3 Owner/Owner representative shall review/approve all the documents related to ITP/Quality manuls/Drawings etc. submitted by supplier.

4 Owner / Owner's representative including TPIA will have to right to inspect any activity of manufacturing at any time

5 All reference Codes/ Standrds, Documents. P.O. Copies shall be arranged by vendor / Supplier for reference of TPIA/PMC/Client at the time of Inspection

6 At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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Rev. : 0
Edition : 1

SPECIFICATION
FOR
HEALTH, SAFETY
AND
ENVIRONMENT (HSE)
MANAGEMENT

SPECIFICATION NO.: BR/HSE/001

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B AND R
Building Nation Since 1920

BRIDGE AND ROOF CO. (I) LTD.	STANDARD TECHNICAL SPECIFICATION		
TITLE	**HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT**	DOCUMENT NO. **BR/HSE/001**	Page 1 of 1 REVISION : 0 EDITION : 1

C O N T E N T S

SL. NO.	DESCRIPTION
1.0	SCOPE
2.0	REFERENCES
3.0	REQUIREMENT OF HEALTH, SAFETY & ENVIRONMENT (HSE) MANAGEMENT SYSTEM TO BE COMPLETED BY BIDDERS.
4.0	DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR
5.0	RECORDS
	ANNEXURE-A
	ANNEXURE-B
	ANNEXURE-C
	ANNEXURE-D
	ANNEXURE-E

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :

BRIDGE AND ROOF CO. (I) LTD.	STANDARD TECHNICAL SPECIFICATION		
TITLE	**HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT**	DOCUMENT NO. **BR/HSE/001**	Page 1 of 1 REVISION : 0 EDITION : 1

AMENDMENT STATUS

Sl. No.	Clause / Paragraph / Annexure / Exhibit / Drawing Amended	Page No.	Revision	Date	By (Name)	Verified (Name)

1.0 SCOPE

This specification establishes the Healthy, Safety and Environment (HSE) management requirement to be compiled with by the Contractors during construction.

This specification is not intended to replace the necessary professional judgement needed to design & implement an effective HSE system for construction activities and the contractor is expected to exceed requirements given in this specification.

Requirement stipulated in this specification shall supplement the requirement of HSE management given in relevant Act (S)/ legislations. General Condition of Contract (GCC) Special Condition of Contract (SCC) and Job Specifications. Where different documents stipulate different requirements, the most stringent shall be adopted.

2.0 REFERENCES

This document should be read in conjunction with following:

- General Conditions of Contract (GCC)
- Special Conditions of Contract (SCC)
- Building and other construction workers (regulation of employment and condition of service) Act, 1996
- Job Specifications
- Relevant IS Codes (refer Annexure-A)
- Reporting Formats (refer Annexure-B)
- Statutory requirements

3.0 REQUIREMENT OF HEALTH, SAFETY & ENVIRONMENT (HSE) MANAGEMENT SYSTEM TO BE COMPLETED BY BIDDERS.

3.1 Management Responsibility

3.1.1 The Contract should have a document HSE policy to cover commitment of the organization to ensure health, safety and environment aspects in their line of operations

3.1.2 The HSE management system of the Contractor shall cover HSE requirement including but not limited to what specified under clause 1.0 & 2.0 mentioned above

3.1.3 Contractor shall be fully responsible for planning and implementing HSE requirement to the satisfaction of the company. Contractor as a minimum requirement shall designate/deploy the following to co-ordinate the above:

No. Of workers deployed		
Up to 250	-	Designate one safety supervisor who will guide the workers from time to time, as well as impart training basic guidelines at least weekly once.

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Above 250 & upto 500	-	Deploy one qualified and experienced safety Engineer/ Officer who will guide the workers from time to time as well as impart basic guideline & training at least weekly once. He / She shall possess a recognized Degree in any branch of engineering or technology or architecture and had a post qualification construction experience of minimum two years or possess a recognized Diploma in any branch of engineering or technology or Graduate in Science stream and had a post qualification construction experience of minimum five years.
Above 500 (for every 500 or less)	-	One additional safety engineer/Officer whose function will be as mentioned above

Contractor shall indemnify and hold harmless OWNER / Consultant & their representative's from any and all liabilities arising out of non fulfillment of HSE requirements.

Above is the minimum requirement and the Contractor shall ensure physical presence of a safety personnel at each place where Hot work permit is required. No work shall be started at site until above safety personnel are physically present at site. The contractor shall submit a safety organogram clearly indicating the lines of responsibility and reporting system. He shall furnish Bio-Data/Resume/Curriculum Vitae of the safety personnel he intends to mobilize, at least 1 month before the intended mobilization, for Consultant/Owner's approval.

3.1.4 The Contractor shall ensure that the Health, Safety and Environment (HSE) requirements are clearly understood & faithfully implemented at all levels, at each and every site/ work place.

3.1.5 The Contractor shall promote and develop consciousness for Health, Safety and Environment among all personnel working for the Contractor. Regular awareness programs and fabrication shop/work site meeting shall be arranged on HSE activities to cover hazards involved in various operations during construction.

3.1.6 Arrange suitable first aid measures such as First Aid Box, trained personnel to give First Aid, Stand by Ambulance or Vehicle and install fire protection measures such as: adequate number of steel buckets with sand and water and adequate fire extinguishers to the satisfaction of OWNER / Consultant. In case the number of workers exceeds 500, the Contractor shall position an ambulance /vehicle on full time basis very close to the worksite.

3.1.7 The Contractor shall evolve a comprehensive planned and documented system for implementation and monitoring of the HSE requirements. This shall submitted to

OWNER & Consultant for approval well in advance, prior to start of work. The monitoring for implementation shall be done by regular inspection and compliance to the observations thereof. The Contractor shall get similar HSE requirements implemented at his sub-contractor (s) work site/ Office. However, compliance of HSE requirement shall be the sole responsibility of the Contractor. Any review/ approval by OWNER / Consultant shall not absolve the Contractor of his responsibility/ liability in relation to all HSE requirements.

3.1.8 Non-Conformance on HSE by the Contractor (including his Sub-contractors) as brought out during review/ audit by Consultant / OWNER representative shall be resolved forthwith by Contractor. Compliance report shall be possibility submitted to Consultant / OWNER at the earliest.

3.1.9 The Contractor shall ensure participation of his Resident Engineer/Site-in-Charge in the Safety Committee/HSE Committee meetings arranged by OWNER / Consultant. The compliance of any observation shall be arranged urgently. Contractor shall assist OWNER/Consultant to achieve the targets set by them on HSE during the project implementation.

The contractor shall ensure that his staff members & workers (permanent as well casual) shall not be in a state of intoxication during working hours and shall abide by any law relating to consumption & possession of intoxicating drinks or drugs in force. Awareness about local laws on this issue shall form part of the Induction Training.

The contractor shall ensure that all personnel working for him comply with No-smoking requirements of the owner as notified from time to time. Cigarettes, lighters, auto ignition tools or appliances shall not be allowed inside the plant complex. Smoking shall be permitted only inside smoking booths expressly designated & authorized by the Owner/Consultant.

3.1.10 The Contractor shall adhere consistently to all provisions of HSE requirements. In case of non-compliance or continuous failure in implementation of any of HSE provisions; OWNER / Consultant may impose stoppage of work without any Cost & Time implication to Owner and/or impose a suitable penalty for non-compliance with a notice of suitable period, upto a cumulative limit of 1.0% (one percent) of Contract value with a ceiling of Rs. 10 lakhs.

0.2% (Zero decimal two percent) of the contract value for LSTK, EPC, EPCC or Package contracts with an overall ceiling of Rs. 1,00,00,000/- (Rupees one crore).

S. No.	Violation or HSE norms	Penalty Amount
1.	For not using personal protective equipment (Helmet, Shoes, Goggles, Gloves, Full body harness, Face shield, Boiler suit, etc.)	Rs. 250/- per day / item / person
2.	Working without Work Permit / Clearance	Rs.5,000/- per occasion

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S. No.	Violation or HSE norms	Penalty Amount
3.	Unsafe electrical practices (not installing ELCB, using poor joints of cables, using naked wire without top plug into socket, laying wire / cables on the roads, electrical jobs by incompetent person, etc.)	Rs.3,000/- per item per day.
4.	Working at height without full body harness, using non-standard / rejected scaffolding and not arranging fall protection arrangement as required like Safety Nets.	Rs.1,000/ per case per day.
5.	Unsafe handling of compressed gas cylinders (No trolley, jubilee clips double gauge regulator, improper storage / handling).	Rs. 100/- per item per day
6.	Use of domestic LPG for cutting purpose.	Rs.1,000/- per occasion
7.	No fencing / barricading of excavated areas.	Rs.1,000/- per occasion
8.	Not providing shoring / strutting / proper slope and not keeping the excavated earth at least 1.5 M away from excavated area.	Rs.5,000/- per occasion
9.	Non display of caution boards, list of hospitals, emergency services available at work locations.	Rs.500/- per occasion
10.	Traffic rules violations like over speeding of vehicles, rash driving, wrong parking, not using seat belts, vehicles not fitted with reverse warning alarms.	Rs.1,000/- per occasion
11.	Absence of Contractor's top most executive at site in the safety meetings whenever called by Consultant / Owner	Rs.1,000/- per occasion
12.	Failure to maintain safety records by Contractor Safety personnel.	Rs.1,000/- per month.
13.	Failure to conduct daily safety site inspection, HSE meeting and HSE audit at predefined frequencies.	Rs.1,000/- per occasion
14.	Failure to submit the monthly HSE report by 5th of subsequent month to Engineer-in-Charge.	Rs. 1,000/- per occasion and Rs. 100/- per day for further delay.
15.	Poor House Keeping	Rs.1,000/- per occasion
16.	Failure to report & follow up accident (including Near Miss) reporting system.	Rs. 10,000/- per occasion

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S. No.	Violation or HSE norms	Penalty Amount
17.	Degradation of environment (not confining toxic spills oil / lubricants onto ground)	Rs.1,000/- per occasion
18.	Not medically examining the workers before allowing them to work at height, not providing ear muffs while allowing them to work in noise polluted areas, made them to work in air polluted areas without respiratory protective devices, etc.	Rs.1,000/- per occasion
19.	Violation of any other safety condition as per job HSE plan, work permit and HSE conditions of contract (using crowbar on cable trenches, improper welding booth, not keeping fire extinguisher ready at hot work site, unsafe rigging practices, non-availability of First-Aid box, etc.)	Rs.1,000/- per occasion
20.	Any violation not covered above.	To be decided by Consultant / Owner

This penalty shall be in addition to all other penalties specified else where in the contract. The decision of imposing stoppage of work, its extent & monitory penalty shall rest with Consultant/OWNER & binding on the Contractor.

3.1.11 All fatal accidents and other personnel accidents shall be investigated by a team of Contractor's senior personnel for root cause and recommend corrective and preventive actions. Findings shall documented and suitable actions taken to avoid recurrences shall be communicated to OWNER / Consultant. OWNER / Consultant shall have the liberty to independently investigate such occurrences and Contractor shall extend all necessary help and co-operation in this regard. Consultant / Owner shall have to right to share the content of this report with the outside world.

3.2 **House Keeping**

3.2.1 Contractor shall ensure that a high degree of house keeping is maintained and shall ensure the followings:

a. All surplus earth and debris are removed/disposed off from the working site to identified location (s).

b. Unused/Surplus Cables Steel items and steel scrap lying scattered at different places within the working areas are removed to identified location (s).

c. All wooden scrap, empty wooden cable drums and other combustible packing materials shall be removed from work place to identified location(s).

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d. Roads shall be kept clear and materials like pipes, steel, sand, boulders, concrete chips and bricks, etc. shall not be allowed in the roads to obstructs free movement of men & machineries.

e. Fabricated steel structurals, pipes & piping materials shall be stacked properly for erection.

f. Water logging on rods shall not be allowed.

g. No parking of trucks/ trolleys, cranes and trailors etc. shall be allowed on of roads, which may obstruct the traffic movements.

h. Utmost care shall be taken to ensure over all cleanliness and proper up keep of the working areas.

i. Trucks carrying sand, earth and pulverized materials etc. shall be covered while moving within the plant areas.

j. The contractor shall ensure that the atmosphere in plant area and on roads is free from particulate matter like dust, sand, etc. by keeping the top surface wet for ease in breathing.

k. At least two exits for any unit area shall be assured at all times.

3.3 **Healthy, Safety and Environment**

a) The Contractor shall provide safe means of access to any working place including provision of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen, and OWNER/ Consultant. Contractor shall ensure deployment of appropriate equipment and appliances for adequate safety and healthy of the workmen and protection of surrounding areas.

Contractor shall ensure identification of all Occupational Health, Safety & Environmental hazards in the type of work he is going to undertake and enlist mitigation measures. Contractor shall carry out Job Safety Analysis (JSA) specifically for high risk jobs like working at height & in confined space, deep excavations, radiography jobs, electrical installations, blasting operations, demolishing / dismantling activities, welding / gas cutting jobs and submit the findings to Consultant / Owner. The necessary HSE measures devised shall be in place prior to start of an activity by the contractor.

b) The Contractor shall ensure that all their staff workers including their sub-Contractor (s) shall wear Safety Helmet and Safety shoes. Contractor shall also ensure use of safety belt, protective goggles, gloves etc. by the personnel as per jobs requirements. All these gadgets shall conform to relevant IS specification equivalent.

The Contractor shall ensure that all their staff, workers and visitors including their sub-contractor(s) have been issued (records to be kept) & wear appropriate PPEs like nape strap type safety helmets preferably with head & sweat band with ¾" cotton chin strap (made of industrial HDPE), safety shoes with steel toe cap and antiskid sole, full body harness (C∈ marked and conforming to EN361), protective goggles, gloves, ear muffs, respiratory protective devices, etc. All these gadgets shall conform to applicable IS Specifications / C∈ or other applicable international standards.

Owner may issue a comprehensive color scheme for helmets to be used by various agencies. The Contractor shall follow the scheme issued by the owner. All Safety / Fire personnel shall preferably wear red colour helmet so that workmen can approach them for guidance during emergencies.

For shot blasting, the usage of protective face shield and helmets, gauntlet and protective clothing is mandatory.

For offshore jobs/contracts, contractor shall provide PPEs (new) to Consultant & Owner's personnel, at his (contractor's) cost. All personnel shall wear life jacket at all time.

An indicative list of HSE standards/codes is given under Appendix-A.

The contractor shall issue height permit for working at height after verifying and certifying the checkpoints as specified in the attached permit (Format No. HSE-6). He shall also undertake to ensure compliance to the conditions of the permit during the currency of the permit including adherence to personal protective equipments.

The permit shall be issued initially for one week or expected duration of an activity and extended further for the balance duration. This permit shall be applicable in areas where specific clearance from Owner's operation Deptt. / Safety Deptt. is not required. Consultant field Engineers / Safety Officers / Area Coordinators may verify and counter sign this permit (as an evidence of verification) during the execution of the job.

In case work is undertaken without taking sufficient precautions as given in the permit, Consultant Engineers may cancel the permit and stop the work till satisfactory compliance is arranged. Contractors are expected to maintain a register for issuance of permit and extensions thereof including preserving the used permits for verification during audits etc.

Contractor shall arrange (at his cost) and ensure use of Fall Arrester Systems by his workers. Fall arresters are to be used while climbing / descending tall structures. These arresters should lock automatically against the anchorage line, restricting free fall of the user. The device is to be provided with a double security opening system to ensure safe attachment or release of the user at

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any point of rope. In order to avoid shock, the system should be capable of keeping the person in vertical position in case of a fall.

Contractor shall ensure that Full body harnesses conforming EN361 and having authorized CC marking is used by all personnel while working at height. The lanyards and life lines should have enough tensile strength to take the load of the worker in case of a fall. One end of the lanyard shall be firmly tied with the harnesses and the other end with life line. The harness should be capable of keeping the workman vertical in case of a fall, enabling him to rescue himself.

Contractor shall provide Roof Top Walk Ladders for carrying out activities on sloping roofs in order to reduce the chances of slippages and falls.

c) Contractor shall ensure that a proper Safety Net System shall be used at appropriate locations. The safety net shall be located not more than 30 feet (9.0 metres) below the working surface at site to arrest or to reduce the consequences of possible fall of persons working at different heights.

d) Contractor shall ensure that flash back arrestors conforming to BS:6158 or equivalent are installed on all gas cylinders as well as at the torch end of the gas hose, while in use. All cylinders shall be mounted on trolleys and provided with a closing key. The burner and the hose placed downstream of pressure reducer shall be equipped with Flash Back Arrester / Non Return Valve device. The hoses for acetylene and oxygen cylinders must be of different colours. Their connections to cylinders and burners shall be made with a safety collar. At end of work, the cylinders in use shall be closed and hoses depressurized. All welding machines shall have effective earthing. In order to help maintain good housekeeping, and to reduce fire hazard, live electrode bits shall be contained safely and shall not be thrown directly on the ground.

e) The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health for driving of vehicles, handling and erections of materials and equipment's. All lifting equipments shall be tested certified for its capacity before use. Adequate and suitable lighting at every work place and approach there to shall be provided by the contractor before starting the actual work/ operation at night.

Contractor shall ensure installation of Safe Load Indicator (SLI) on all cranes (while in use) to minimize overloading risk. SLI shall have capability to continuously monitor and display the load on the hook, and automatically compare it with the rated crane capacity at the operating condition of the crane. The system shall also provide visual and audible warnings at set capacity levels to alert the operator in case of violations.

The contractor shall be responsible for safe operations of different equipments mobilized and used by him at the workplace like transport

vehicles, engines, cranes, mobile ladders, scaffoldings, work tools, etc.

f) Hazardous and/or toxic material such as solvent coating or thinners shall be stored in appropriate containers.

g) All hazardous materials shall be labeled with the name of the materials, the hazards associated with its use and necessary precautions to be taken.

The work place shall be checked prior to start of activities to identify the location, type and condition of any asbestos materials which could be disturbed during the work. In case asbestos material is detected, usage of appropriate PPEs by all personnel shall be ensured and the matter shall be reported immediately to Consultant / Owner.

h) Contractor shall ensure that during the performance of the work all hazards to the health of personnel have been identified assessed and eliminated.

i) Chemical spills shall be contained & cleaned up immediately to prevent further contamination.

j) All personnel exposed to physical agents such as ionizing or non-ionizing radiation ultraviolet rays or similar other physical agents shall be provided with adequate shielding or protection commensurate with type of exposure involved. For ionizing radiation, requirements of Bhabha Atomic Research Centre (BARC)/ Atomic Energy Regulatory Board (AERB) shall be followed.

k) Where contract or exposure of hazardous materials could exceed limits or could otherwise have harmful affects, appropriate personal protective equipment's such as gloves, goggles, aprons, chemical resistant clothing and respirator shall be used.

l) Contractor shall ensure the following facilities at work sites:

I) A Crèche where 10 or more female workers are having children below the age of 6 years.

II) Reasonable Canteen facilities are made available at appropriate location depending upon site conditions.

m) Suitable facilities for toilet, drinking water, proper lighting shall be provided at site and labor camps, commensurate with applicable Laws/Legislation.

n) Contractor shall ensure storage and utilization methodology of material that are not detrimental to the environment. Wherever required Contractor shall ensure that only the environment friendly material are selected.

Emphasize on recycling of waste materials such as metals, plastics, glass, paper, oil & solvents. The waste that can not be minimized, reused or

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recovered shall be stored and disposed of safely. In no way, toxic spills shall be allowed to percolate into the ground. The contractor shall not use the empty areas for dumping the wastes.

o) All person deployed at site shall be knowledgeable of and comply with the environmental laws, rules & regulation relating to the hazardous materials substance and wastes. Contractor shall not dump, release or otherwise discharge or dispose off any such materials without the authorization of OWNER / Consultant.

Suitable scaffoldings shall be provided to workmen for all works that cannot be safely done from the ground or from solid construction except such short period work that can be safely done using ladders. When a ladder is used, an extra workman shall be engaged for holding the ladder.

The contractor shall ensure that the scaffolds used during construction activities shall be strong enough to take the designed load. Owner / Consultant reserves the right to ask the contractor to submit certification and or design calculations from his Engineering regarding load carrying capacity of the scaffoldings.

All scaffolds shall be inspected by a Scaffolding Inspector of the contractor. He shall paste a GREEN tag on each scaffold found safe and a RED tag on each scaffold found unsafe. Scaffolds with GREEN tag only shall be permitted to be used and RED ones shall immediately be removed from the site.

All electrical installations / connections shall be carried out as per the provisions of latest revision of following codes/standards, in addition to the requirements of Statutory Authorities and IE / applicable international rules & regulations:

- OISO SID 173 : Fire prevention & protection system for electrical installations
- SP 30 (BIS) : National Electric Code

All electrical installations shall be approved by the concerned statutory authorities.

- The contractor shall meet the following requirements:

i) Ensure that electrical systems and equipment including tools & tackles used during construction phase are properly selected, installed, used and maintained as per provisions of the latest revision of the Indian Electrical / applicable international regulations.

ii) Shall deploy qualified & licensed electricians for proper & safe installation and for regular inspection of construction power

distribution system / points including their earthing. A copy of the license shall be submitted to Consultant/Owner for records. Availability of at least one competent licensed electrician shall be ensured at site round the clock to attend to the normal / emergency jobs.

iii) All switchboards / welding machines shall be kept in well-ventilated & covered shed. The shed shall be elevated to avoid water logging. No flammable materials shall be used for constructing the shed. Also flammable materials shall not be stored in and around electrical equipment / switchboard. Adequate clearances and operational space shall be provided around the equipment.

iv) Fire extinguishers and insulating mats shall be provided in all power distribution centers.

v) Temporary electrical equipment shall not be employed in hazardous area without obtaining safety permit.

vi) Proper house keeping shall be done around the electrical installations.

vii) All temporary installations shall be tested before energising, to ensure proper earthing, bonding, suitability of protection system, adequacy of feeders/cables etc.

viii) All welders shall use hand gloves irrespective of holder voltage.

ix) Multilingual (Hindi, English and local language) caution boards, shock treatment charts and instruction plate containing location of isolation point for incoming supply, name & telephone No. of contact person in emergency shall be provided in substations and near all distribution boards / local panels.

x) Operation of earth leakage device shall be checked regularly by temporarily connecting series test lamp (2 bulbs of equal rating connected in series) between phase and earth.

xi) Regular inspection of all installations (at least once in a month)

- The following features shall also be ensured for all electrical installations during construction phase by the contractor:

i) Each installation shall have a main switch with a protective device, installed in an enclosure adjacent to the metering point. The operating height of the main switch shall not exceed 1.5 M. The main switch shall be connected to the point of supply by means of armoured cable.

ii) The outgoing feeders shall be double or triple pole switches with fuses / MCBs. Loads in a three phase circuit shall be balanced as far as

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possible and load on neutral should not exceed 20% of load in the phase.

iii) The installation shall be adequately protected against overload, short circuit and earth leakage by the use of suitable protective devices. Fuses wherever used shall be HRC type. Use of rewirable fuses shall be strictly prohibited. The earth leakage device shall have an operating current not exceeding 30 mA.

iv) All connections to the hand tools / welding receptacles shall be taken through proper switches, sockets and plugs.

v) All single phase sockets shall be minimum 3 pin type only. All unused sockets shall be provided with socket caps.

vi) Only 3 core (P+N+E) overall sheathed flexible cables with minimum conductor size of 1.5 mm^2 copper shall be used for all single phase hand tools.

vii) Only metallic distribution boxes with double earthing shall be used at site. No wooden boxes shall be used.

viii) All power cables shall be terminated with compression type cable glands. Tinned copper lugs shall be used for multistrand wires / cables.

ix) Cables shall be free from any insulation damage.

x) Minimum depth of cable trench shall be 750 mm for MV & control cables and 900 mm for HV cables. These cables shall be laid over a sand layer and covered with sand, brick & soil for ensuring mechanical protection. Cables shall not be laid in waterlogged area as far as practicable. Cable route markers shall be provided at every 25 M of buried trench route. When laid above ground, cables shall be properly cleated or supported on rigid poles of atleast 2 M high. Minimum head clearance of 6 meters shall be provided at road crossings.

xi) Under ground road crossings for cables shall be avoided to the extent feasible. In any case no under ground power cable shall be allowed to cross the roads without pipe sleeve.

xii) All cable joints shall be done with proper jointing kit. No taped / temporary joints shall be used.

xiii) An independent earthing facility should preferably be established within the temporary installation premises. All appliances and

equipment shall be adequately earthed. In case of armoured cables, the armour shall be bonded to the earthing system.

xiv) All cables and wire rope used for earth connections shall be terminated through tinned copper lugs.

xv) In case of local earthing, earth electrodes shall be buried near the supply point and earth continuity wire shall be connected to local earth plate for further distribution to various appliances. All insulated wires for earth connection shall have insulation of green colour.

xvi) Separate core shall be provided for neutral. Earth / Structures shall not be used as a neutral in any case.

xvii) ON/OFF position of all switches shall be clearly designated / painted for easy isolation in emergency.

The contractor shall identify all operations that can adversely affect the health of its workers and issue & implement mitigation measures.

For surface cleaning operations, sand blasting shall not be permitted even if not explicitly stated elsewhere in the contract.

To eliminate radiation hazard, Tungsten electrodes used for Gas Tungsten Arc Welding shall not contain Thorium.

Appropriate respiratory protective devices shall be used to protect workmen from inhalation of air borne contaminants like silica, asbestos, gases, fumes, etc.

Workmen shall be made aware of correct methods for lifting, carrying, pushing & pulling of heavy loads. Wherever possible, manual handling shall be replaced by mechanical lifting equipments.

For jobs like drilling / demolishing / dismantling where noise pollution exceeds the specified limit of 85 decibels, ear muffs shall be provided to the workers.

To avoid upper limb disorders and backaches, Display Screen Equipments' workplace stations shall be carefully designed & used with proper sitting postures. Power driven hand-held tools shall be maintained in good working condition to minimize their vibrating effects and personnel using these tools shall be taught how to operate them safely & how to maintain good circulation in hands.

The contractor shall arrange health check up for all the workers at the time of induction. Health check may have to be repeated if the nature of duty assigned to him is changed necessitating health check or doubt arises about his wellness. Consultant / Owner reserve the right to ask the contractor to submit test reports.

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Weather Protection

Contractor shall take appropriate measures to protect workers from severe storms, solar radiations, poisonous gases, dust, etc. by ensuring proper usage of PPEs like Sun glasses, Sun screen lotions, respirators, dust masks, etc. and rearranging / planning the construction activities to suit the weather conditions.

Communication

All persons deployed at the work site shall have access to effective means of communication so that any untoward incident can be reported immediately and assistance sought by them.

All health & safety information shall be communicated in a simple & clear language easily understood by the local workforce.

Unsuitable Land Conditions

Contractor shall take appropriate measures and necessary work permits / clearances if work is to be done in or around marshy areas, river crossings, mountains, monuments, etc.

Under Water Inspection

Contractor shall ensure that boats and other means used for transportation, surveying & investigation works shall be certified seaworthy by a recognized classification society. It shall be equipped with all life saving devices like life jackets, adequate fire protection arrangements and shall posses communication facilities like cellular phones, wireless, walkie-talkie. All divers used for seabed surveys, underwater inspections shall have required authorized license, suitable life saving kit. Number of hours of work by divers shall be limited as per regulations. Consultant / Owner shall have the right to inspect the boat and scrutinize documents in this regard.

TOOL BOX MEETING (TBM)

Contractor shall conduct daily TBM with workers prior to start of work and shall maintain proper record of the meeting. A suggested format is given below. The TBM is to be conducted by the immediate supervisor of the workers.

TOOLBOX MEETING RECORDING SHEET

Date & Time		
Subject		
Presenter		
Hazards involved		
Precautions to be taken		
Worker's Name	Signature	Section
Remarks, if any		

The topics during TBM shall include

- Hazards related to work assigned on that day and precautions to be taken.
- Any forthcoming HSE hazards / events / instruction / orders, etc.

The above record can be kept in local language, which workers can read. These records shall be made available to Consultant / Owner whenever demanded.

TRAINING

Contractor shall ensure that all his personnel possess appropriate training to carry out the assigned job safely. The training should be imparted in a language understood by them and should specifically be trained about

- Potential hazards to which they may be exposed at their workplace
- Measures available for prevention and elimination of these hazards

The topics during training shall cover, at the minimum;

- Education about hazards and precautions required
- Emergency and evacuation plan
- HSE requirements
- Fire fighting and First-Aid
- Use of PPEs
- Local laws on intoxicating drinks, drugs, smoking in force

Records of the training shall be kept and submitted to Consultant / Owner whenever demanded.

For offshore and jetty jobs, contractor shall ensure that all personnel deployed have undergone a structured sea survival training including use of lifeboats, basket landing, use of radio communication etc. from an agency acceptable to Owner / Consultant.

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INSPECTION

The contractor shall carryout daily HSE inspection and record observations at a central location. These inspection records shall be freely accessible to Owner / Consultant representatives. The contractor shall also assist Owner / Consultant representatives during the HSE inspections conducted by them.

ADDITIONAL SAFETY REQUIREMENTS FOR WORKING INSIDE A RUNNING PLANT

As a minimum, the contractor shall ensure adherence to following safety requirements while working in or in the close vicinity of an operating plant :

a) Contractor shall obtain permits for Hot work, Cold work, Excavation and Confined Space from Owner in the prescribed format.

b) The contractor shall monitor, record and compile list of his workers entering the operational plant/unit each day and ensure & record their return after completing the job.

c) Contractor's workers and staff members shall use designated entrances and proceed by designated routes to work areas only assigned to them. The workers shall not be allowed to enter units' area, tanks area, pump rooms, etc. without work authorization permit.

d) Work activities shall be planned in such a way so as to minimize the disruption of other activities being carried out in an operational plant / unit and activities of other contractors.

e) The contractor shall submit a list of all chemicals / toxic substances that are intended to be used at site and shall take prior approval of the Owner.

f) Specific training on working in a hydrocarbon plant shall be imparted to the work force and mock drills shall be carried out for Rescue operations / First-Aid measures.

g) Proper barricading / cordoning of the operational units / plants shall be done before starting the construction activities. No unauthorized person shall be allowed to trespass. The height and overall design of the barricading structure shall be finalized in consultation with the Owner and shall be got approved from the Owner.

h) Care shall be taken to prevent hitting underground facilities such as electrical cables, hydrocarbon piping during execution of work.

i) Barricading with water curtain shall be arranged in specific/critical areas where hydrocarbon vapors are likely to be present such as near horton spheres or tanks. Positioning of fire tenders (from owner) shall also be ensured during execution of critical activities.

j) Emergency evacuation plan shall be worked out and all workmen shall be apprised about evacuation routes. Mock drill operations may also be conducted.

k) Flammable gas test shall be conducted prior to any hot work using appropriate measuring instruments. Sewers, drains, vents or any other gas escaping points shall be covered with flame retardant tarpaulin.

l) Respiratory devices shall be kept handy while working in confined zones where there is a danger of inhalation of poisonous gases. Constant monitoring of presence of Gas / Hydrocarbon shall be done.

m) Clearance shall be obtained from all parties before starting hot tapping, patchwork on live lines and work on corroded tank roof.

n) Positive isolation of line/equipment by blinding for welding/cutting/grinding shall be done. Closing of valve will not be considered sufficient for isolation.

o) Welding spatters shall be contained properly and in no case shall be allowed to fall on the ground containing oil. Similar care shall be taken during cutting operations.

p) The vehicles, cranes, engines, etc. shall be fitted with spark arresters on the exhaust pipe and got it approved from Safety Department of the Owner.

q) Plant air should not be used to clean any part of the body or clothing or use to blow off dirt on the floor.

r) Gas detectors should be installed in gas leakage prone areas as per requirement of Owner's plant operation personnel.

s) An experienced full time safety personnel shall be exclusively deployed to monitor safety aspects in running plants.

HSE PROMOTION

The contractor shall encourage his workforce to promote HSE efforts at workplace by way of organizing workshops / seminars / training programmes, celebrating HSE awareness weeks & National Safety Day, conducting quizzes & essay competitions, distributing pamphlets, posters & material on HSE, providing incentives for maintaining good HSE practices and granting bonus for completing the job without any lost time accident.

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4.0 DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR

4.1 On Award of Contract

The Contractor shall prior to start of work submit his Health. Safety and Environment Manual of procedure and HSE Plans for approval by OWNER/Consultant. The Contractor shall participate in the pre-start meeting with OWNER/Consultant to finalize HSE plans including the following.

- Job procedure to be followed by Contractor for activities covering Handling of equipment's, Scaffolding, Electric Installation, describing the risks involved, actions to be taken and methodology for monitoring each.

- Organizations structure alongwith responsibility and authority records/ reports etc. on HSE activities.

4.2 During job execution

4.2.1 Implement approved Health, Safety and Environment management procedure including but not limited to as brought our under para 3.0. Contractor shall also ensure to:

- Arrange workmen compensation insurance, registration under ESI Act, third party liability insurance etc. as applicable.

- Arrange all HSE permits before start of activities (as applicable) like her work, confined space, work at heights, storage of Chemicals/explosives materials and its use and implement all precautions mentioned therein

- Submit timely the completed check list on HSE activities, Monthly HSE report, accident report, investigation report, etc. as per OWNER/Consultant requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to OWNER/Consultant.

- Ensure that resident Engineers/Site-In-Charge of the Contractor shall amend all the Safety Committee/HSE meeting arranged by OWNER/ Consultant only in case of his absence from site, a seconds senior most person shall be nominated by him in advance and communicated to OWNER/Consultant.

- Display at site office and work locations caution boards, list of hospitals for emergency services available.

- Provided posters, banners, for safe working to promote safety consciousness

- Carryout audits/inspection at sub Contractor work as per approved HSE documents & submit the reports for OWNER/Consultant review.

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- Assist in HSE audits by OWNER / Consultant and submit compliance report.
- Generate & submit HSE records/ reports as per HSE Plan.
- Appraise OWNER/Consultant on HSE activities at site.

5.0 RECORDS

At the minimum, the contractor shall maintain/ submit HSE records in the following reporting formats:

1.	Monthly HSE Checklist cum compliance report	HSE-1
2.	Accident / Incident Report	HSE-2
3.	Supplementary Accident / Incident Investigation report	HSE-3
4.	Near Miss Incident Report	HSE-4
5.	Monthly HSE Report	HSE-5
6.	Permit for working at height	HSE-6
7.	Permit for working in confined space	HSE-7
8.	Permit for radiation work	HSE-8
9.	Permit for demolishing / dismantling	HSE-9

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ANNEXURE-A

A. I.S. CODES ON HSE

SP:53	Safety code for the use, Care and protection of hand operated tools.
IS: 818	Code of practice for safety and health requirements in electric and gas welding and cutting operations
IS: 1179	Eye and Face precautions during welding, equipment etc.
IS: 1860	Safety requirements for use, care and protection of abrasive grinding wheels.
IS: 1989(Part-I & II)	Leather safety boots and shoes
IS: 2925	Industrial Safety Helmets
IS: 3016	Code of practice for fire safety precautions in welding and cutting operations.
IS: 3043	Code of practice for earthing.
IS: 3764	Code of safety for excavation work
IS: 3786	Methods for computation of frequency and severity rates for industrial injuries and classification of industrial accidents.
IS: 3996	Safety Code of scaffolds and ladders.
IS: 4082	Recommendation on stacking and storage of construction materials and components at site.
IS: 4770	Rubber gloves for electrical purposes
IS: 5121	Safety code for piling and other deep foundations
IS: 5216 (Part-I)	Recommendations on Safety procedures and practices in electrical works
IS: 5557	Industrial and Safety rubber lined boots.
IS: 5983	Eye protectors
IS:6519	Selection, care and repair of Safety footwear
IS: 6994 (Part-I)	Industrial Safety Gloves (Leather & Cotton Gloves)
IS: 7293	Safety Code for working with construction Machinery

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IS: 8519	Guide for selection of industrial safety equipment for body protection
IS: 9167	Ear protectors
IS: 11006	Flash back arrestor (Flame arrestor)
IS:11016	General and safety requirements for machine tools and their operation
IS: 11057	Specification for Industrial safety nets
IS: 11226	Leather safety footwear having direct moulded rubber sole
IS: 11972	Code of practice for safety precaution to be taken when entering a sewerage system
IS: 13367	Code of practice-safe use of cranes
IS: 13416	Recommendations for preventive measures against hazards at working place

B. INTERNATIONAL STANDARDS ON HSE

Safety Glasses	:	ANSI Z 87.1, ANSI ZZ 87.1, AS 1337, BS 2092, BS 1542, BS 679, DIN 4646 / 58211
Safety Shoes	:	ANSI Z 41.1, AS 2210, EN 345
Hand Gloves	:	BS 1651
Ear Muffs	:	BS 6344, ANSI S 31.9
Hard Hat	:	ANSI Z 89.1 / 89.2, AS 1808, BS 5240, DIN 4840
Goggles	:	ANSI Z 87.1
Face Shield	:	ANSI Z 89.1
Breathing Apparatus	:	BS 4667, NIOSH
Welding & Cutting	:	ANSI Z 49.1
Safe handling of compressed Gases in cylinders	:	P-1 (Compressed Gas Association 1235 Jefferson Davis Highway, Arlington VA 22202 – USA)

ANNEXURE-B

DETAILS OF FIRST AID BOX

SL. NO	DESCRIPTION	*QUANTITY*
1.	Small size Roller Bandages, 1 inch wide (Finger Dressing small)	6 Pcs.
2.	Medium size Roller Bandages, 2 inch wide (Hand and Foot Dressing)	6 Pcs.
3.	Large size Roller Bandages, 4 inch wide (Body Dressing Large)	6 Pcs.
4.	Large size Burn Dressing (Burn Dressing Large)	4 Pkts.
5.	Cotton wool (20 gms packing)	4 Pkts.
6.	Antiseptic Solution Dettol (100 ml.) or Savlon	1 Bottle
7.	Mercurochrome Solution (100 ml.) 2% in water	1 Bottle
8.	Ammonia Solution (20 ml.)	1 Bottle
9.	A Pair of Scrissors	1 Piece
10.	Adhesive Plaster (1.25 cm x 5 m)	1Spool
11.	Eye pads in Separate Sealed Packet	4 Pcs.
12.	Tourniqut	1 No.
13.	Safety Pins	1 Dozen
14.	Tinc. Iodine / Betadin (100 ml.)	1 Bottles
15.	Ointment for burns (Burnol 20 gms.)	1 Bottole
16.	Polythene Wash cup for washing eyes	1 No.
17.	Potassium Permanganate (20 gms.)	1 Pkt.
18.	Tinc. Benzoine (100 ml.)	1 Bottole
19.	Triangular Bandages	2 Nos.
20.	Band Aid Dressing	5 Pcs.
21.	Iodex / Moov (25 gms.)	1 Bottole
22.	Tongue Depressor	1 No.
23.	Boric Acid Powder (20 gms.)	2 Pkt.
24.	Sodium Bicarbonate (20 gms.)	1 Pkt.
25.	Dressing Powder (Nebasulf) (10 gms.)	1 Bottole
26.	Medicinal Glass	1 No.
27.	Duster	1 No.
28.	Booklet (English & Local Language)	1 No. each
29.	Soap	1 No.
30.	Toothache Solution	1 No.
31.	Eye Ointment	1 Bottle
32.	Vicks (22 gms.)	1 Bottle
33.	Forceps	1 No.
34.	Cotton Buds (5 nos.)	1 Pkt.
35.	Note Book	1 No.
36.	Splints	4 Nos.
37.	Lock	1 Piece
38.	Life Saving/Emergency/Over-the Counter Drugs	As decided at site
	Box size : 14” x 12” x 4”	

Note : The medicines prescribed above are only indicative. Equivalent medicines can also be used. A prescription, in this regard, shall be required from a qualified Physician.

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ANNEXURE – C

TYPE OF FIRES VIS-À-VIS FIRE EXTINGUISHERS

Fire	Fire Extinguishers				
	Water	**Foam**	**CO_2**	**Dry Powder**	**Multi Purpose (ABC)**
Originated from paper, clothes, wood	√	√	Can control minor surface fires	Can control minor surface fires	√
Inflammable liquids like alcohol, diesel, petrol, edible oils, bitumen	x	√	√	√	√
Originated from gases like LPG, CNG, H_2	x	x	√	√	√
Electrical Fires	x	x	√	√	√

Legend : √ Can be used
x Not to be used

Note : Fire extinguishing equipment must be checked atleast once a year and after every use by an authorized person. The equipment must have an inspection label on which the next inspection date is given. Type of extinguisher shall clearly be marked on it.

ANNEXURE – D

Indicative List of Statutory Acts & Rules Relating to HSE

- The Indian Explosives Act and Rules
- The Motor Vehicle Act and Central Motor Vehicle Rules
- The Factories Act and concerned Factory Rules
- The Petroleum Act and Petroleum Rules
- The Workmen Compensation Act
- The Gas Cylinder Rules and the Static & Mobile Pressure Vessels Rules.
- The Indian Electricity Act and Rules
- The Indian Boiler Act and Regulations
- The Water (Prevention & Control & Pollution) Act
- The Water (Prevention & Control of Pollution) Cess Act
- The Mines & Minerals (Regulation & Development) Act
- The Air (Prevention & Control of Pollution) Act
- The Atomic Energy Act
- The Radiation Protection Rules
- The Indian Fisheries Act
- The Indian Forest Act
- The Wild Life (Protection) Act
- The Environment (Protection) Act and Rules
- The Hazardous Wastes (Management & Handling) Rules
- The Manufacturing, Storage & import of Hazardous Chemicals Rules
- The Public Liability Act
- The Building and Other Construction Workers (Regulation of Employment and Condition of service) Act
- Other statutory acts Like EPF, ESIS, Minimum Wage Act.

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ANNEXURE – E

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES

ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
(A) EXCAVATION Pit Excavation up to 3.0m	➢ Falling into pit	➢ Personal injury	➢ Provide guard rails/barricade with warning signal. ➢ Provide at least two entries/exits. ➢ Provide escape ladders.
	➢ Earth Collapse	➢ Suffocation / Breathlessness ➢ Buried	➢ Provide suitable size of shoring and strutting, if required. ➢ Keep soil heaps away from the edge equivalent to 1.5m or depth of pit whichever is more. ➢ Don't allow vehicles to operate too close to excavated areas. Maintain at least 2m distance from edge of cut. ➢ Maintain sufficient angle of repose. Provide slope not less than 1:1 and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock. ➢ Battering/benching the sides.
	➢ Contact with buried electric cables ➢ Gas/ Oil Pipelines	➢ Electrocution ➢ Explosion	➢ Obtain permission from competent authorities, prior to excavation, if required. ➢ Locate the position of buried utilities by referring to plant drawings. ➢ Start digging manually to locate the exact position of buried utilities and thereafter use

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ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			mechanical means.
Pit Excavation beyond 3.0m	➢ Same as above plus ➢ Flooding due to excessive rain/ underground water	➢ Can cause drowning situation	➢ Prevent ingress of water ➢ Provide ring buoys ➢ Identify and provide suitable size dewatering pump or well point system
	➢ Digging in the vicinity of existing Building/ Structure	➢ Building/ Structure may collapse ➢ Loss of health & wealth	➢ Obtain prior approval of excavation method from local authorities ➢ Use under-pining method ➢ Construct retaining wall side by side
	➢ Movement of vehicles / equipments close to the edge of cut.	➢ May cause cave-in or slides ➢ Persons may get buried	➢ Barricade the excavated area with proper lighting arrangements ➢ Maintain at least 2m distance from edge of cut and use stop block to prevent over-run. ➢ Strengthen shoring and strutting
Narrow deep excavations for pipelines, etc.	➢ Same as above plus ➢ Frequent cave-in or slides	➢ May cause severe injuries or prove fatal	➢ Battering/benching of sides ➢ Provide escape ladders
	➢ Flooding due to Hydrostatic testing	➢ May arise drowning situation	➢ Same as above plus ➢ Bail out accumulated water ➢ Maintain adequate ventilation
Rock excavation by blasting	➢ Improper handling of explosives	➢ May prove fatal	➢ Ensure proper storage, handling & carrying of explosives by trained personnel. ➢ Comply with the applicable explosive acts & rules.
	➢ Uncontrolled explosion	➢ May cause severe injuries or prove fatal	➢ Allow only authorized persons to perform blasting operations. ➢ Smoking and open

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ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			flames are to be strictly prohibited.
	➢ Scattering of stone pieces in atmosphere	➢ Can hurt people	➢ Use PPE like goggles, face mask, helmets etc.
Rock excavating by blasting (Contd)	➢ Entrapping of persons/ animals.	➢ May cause severe injuries or prove fatal	➢ Barricade the area with red flags and blow siren before blasting.
	➢ Misfire	➢ May explode suddenly	➢ Do not return to site for at least 20 minutes or unless announced safe by designated person.
Piling Work	➢ Failure of pile-driving equipment	➢ Can hurt people	➢ Inspect Piling rigs and pulley blocks before the beginning of each shift.
	➢ Noise pollution	➢ Can cause deafness ➢ and psychological imbalance	➢ Use personal protective equipments like ear plugs, muffs, etc.
	➢ Extruding rods / casing	➢ Can hurt people	➢ Barricade the area an install sign boards ➢ Provide first-aid
	➢ Working in the vicinity of 'Live-Electricity'	➢ Can cause electrocution / asphyxiation	➢ Keep sufficient distance from Live-Electricity as per IS code. ➢ Shut off the supply, if possible ➢ Provide artificial/rescue breathing to he injured.
(B) CONCRETING	➢ Air pollution by cement	➢ May affect Respiratory System	➢ Wear respirators or cover mouth and nose with wet cloth.
	➢ Handling of ingredients	➢ Hand s may get injured	➢ Use gloves and other PPE.
	➢ Protruding reinforcement rods.	➢ Feet may get injured	➢ Use Safety shoes. ➢ Provide platform above reinforcement for movement of workers.
	➢ Earthing of electrical mixers,	➢ Can cause electrocution / asphyxiation	➢ Ensure earthing of equipments and proper functioning of

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ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	vibrators, etc. not done		electrical circuit before commencement of work.
	➢ Falling of materials from height	➢ Persons may get injured	➢ Use hard hats ➢ Remove surplus material immediately from work place ➢ Ensure lighting arrangements during night hours.
	➢ Continuous pouring by same gang	➢ Cause tiredness of workers and may lead to accident.	➢ Insist on shift pattern ➢ Provide adequate rest to workers between subsequent pours.
	➢ Revolving or concrete mixer/ vibrators	➢ Parts of body or clothes may get entrapped.	➢ Allow only mixers with hopper ➢ Provide safety cages around moving motors ➢ Ensure proper mechanical locking of vibrator
Super-structure	➢ Same as above plus ➢ Deflection in props or shuttering material	➢ Shuttering / props may collapse and prove fatal	➢ Avoid excessive stacking on shuttering material ➢ Check the design and strength of shuttering material before commencement of work ➢ Rectify immediately the deflection noted during concreting
	➢ Passage to work place	➢ Improperly tied and designed props / planks may collapse	➢ Ensure the stability and strength of passage before commencement of work ➢ Do not overload and under the passage.
(C) REINFORCEMENT	➢ Curtailment and binding of rods	➢ Persons may get injured	➢ Use PPE like gloves, shoes, helmets, etc. ➢ Avoid usage of shift tools
	➢ Carrying of rods for short distance/ at	➢ Workers may injure their hands and shoulders	➢ Provide suitable pads on shoulders and use safety

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ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	heights		gloves. ➢ Tie up rods in easily liftable bundles ➢ Ensure proper staging.
	➢ Checking of clear distance/ cover with hands	➢ Rods may cut or injure the finger	➢ Use measuring devices tape, measuring rods, etc.
	➢ Hitting projected rods and standing on cantilever rods	➢ Persons may get injured and fall down	➢ Use safety shoes and avoid standing unnecessarily on cantilever rods ➢ Avoid wearing loose clothes
	➢ Falling of material from height	➢ May prove fatal	➢ Use helmets ➢ Provide safety nets
	➢ Transportation of rods by trucks / trailers	➢ Protruded rods may hit the persons	➢ Use red flags/lights at the ends ➢ Do not protrude the rods in front of or by the side of driver's cabin. ➢ Do not extend the rods 1/3rd of deck length or 1.5 m which is less
(D) WELDING AND GAS CUTTING	➢ Welding radiates invisible ultraviolet and infrared says	➢ Radiation can damage eyes and skin.	➢ Use specified shielding devices and other PPE of correct specifications ➢ Avoid throated tungsten electrodes for GTAW.
	➢ Improper placement of oxygen and acetylene cylinders	➢ Explosion may occur	➢ Move out any leaking cylinder ➢ Keep cylinder in vertical position ➢ Use trolley for transportation of cylinders and chain them ➢ Use flash back arrestors
	➢ Leakage / cuts in hoses	➢ May cause fire	➢ Purge regulators immediately and then turn off ➢ Never use grease or

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ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			oil on oxygen line connections and copper fittings on acetylene lines ➢ Inspect regularly gas carrying hoses ➢ Always use red hose for acetylene & other fuel gases and black for oxygen.
	➢ Opening-up of cylinder	➢ Cylinder may burst	➢ Always stand back from the regulator while opening the cylinder ➢ Turn valve slowly to avoid bursting ➢ Cover the lug terminals to prevent short circuiting.
	➢ Welding of tanks, container or pipes storing flammable liquids	➢ Explosion may occur	➢ Empty & purge them before welding ➢ Never attach the ground cable to tanks, container or pipe storing flammable liquids ➢ Never use LPG for gas cutting
(E) RADIOGRAPHY	➢ Ionizing Radiation	➢ Radiations may react with the skin and can cause cancer, skin irritation, dermatitis, etc.	➢ Ensure safety regulations as per BARC/AERB before commencement of job. ➢ Cordon off the area and install Radiation warning symbols ➢ Restrict the entry of unauthorized persons ➢ Wear appropriate PPE and film badges issued by BARC/AERB
	➢ Transportation and Storage of Radiography source	➢ Same as above	➢ Never touch or handle radiography source with hands ➢ Store radiography source inside a pit in an exclusive isolated

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ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			storage room with lock and key arrangement. The pit should be approved by BARC/AERB ➢ Radiography source should never be carried either in passenger bus or in a passenger compartment of trains. ➢ BARC/AERB have to be informed before source movement. ➢ Permission from Director General of Civil Aviation is required for booking radio isotopes with airlines.
	➢ Loss of Radio isotope	➢ Same as above	➢ Try to locate with the help of Survey Meter. ➢ Inform BARC/AERB(*) (*) Atomic Energy Regulatory Board (AERB), Bhabha Atomic Research Centre (BARC) Anushaktinagar, Mumbai – 400 094
(F) ELECTRICAL INSTALLATION AND USAGE	➢ Short circuiting	➢ Can cause Electrocution or Fire	➢ Use rubberized hand gloves and other PPE ➢ Don't lay wires under carpets, mats or door ways. ➢ Allow only licensed electricians to perform on electrical facilities ➢ Use one socket for one appliance ➢ Ensure usage of only fully insulated wires or cables ➢ Don't place bare wire ends in a socket

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ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			➢ Ensure earthing of machineries and equipments ➢ Do not use damaged cords and avoid temporary connections ➢ Use spark-proof/flame proof type field distribution boxes. ➢ Do not allow open/bare connections ➢ Provide all connections through ELCB ➢ Protect electrical cables / equipment's from water and naked flames ➢ Check all connections before energizing.
	➢ Overloading of Electrical System	➢ Bursting of system can occur which leads to fire	➢ Display voltage and current ratings prominently with 'Danger' signs. ➢ Ensure approved cable size, voltage grade and type. ➢ Switch off the electrical utilities when not in use. ➢ Do not allow unauthorized connections. ➢ Ensure proper grid wise distribution of Power.
	➢ Improper laying of overhead and underground transmission lines / cables	➢ Can cause electrocution and prove fatal	➢ Do not lay unarmored cable directly on ground, wall, roof of trees ➢ Maintain at least 3m distance from HT cables ➢ All temporary cables should be laid at least 750 mm below ground on 100 mm

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ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			fine sand overlying by brick soling ➢ Provide proper sleeves at crossings/ intersections ➢ Provide cable route markers indicating the type and depth of cables at intervals not exceeding 30m and at the diversions / termination.
(G) FIRE PREVENTION AND PROTECTION	➢ Small fires can become big ones and may spread to the surrounding areas	➢ Cause burn injuries and may prove fatal.	➢ In case a fire breaks out, press fire alarm system and shout “Fire, Fire” ➢ Keep buckets full of sand & water/fire extinguishing equipment near hazardous locations ➢ Confine smoking to ‘Smoking Zones’ only ➢ Train people for using specific type of fire equipments under different classes of fire ➢ Keep fire doors/ shutters, passages and exit doors unobstructed ➢ Maintain good house keeping and first-aid boxes (for detail refer Annex-2) ➢ Don’t obstruct assess to Fire extinguishers ➢ Do not use elevators for evacuation during fire ➢ Maintain lightening arrestors for elevated structures ➢ Stop all electrical motors with internal combustion. ➢ Move the vehicles from dangerous

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ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			locations. ➢ Remove the load hanging from the crane booms. ➢ Remain out of the danger areas.
	➢ Improper selection of Fire Extinguisher	➢ It may not extinguish the fire	➢ Ensure usage of correct fire extinguisher meant for the specified fire (for details refer Appendix-C) ➢ Do not attempt to extinguish Oil and electric fires with water. Use foam cylinders/CO_2/sand or earth.
	➢ Improper storage of highly inflammable substances	➢ Same as above	➢ Maintain safe distance of flammable substances from source of ignition ➢ Restrict the distribution of flammable materials to only min. necessary amount ➢ Construct specifically designed fuel storage facilities ➢ Keep chemicals in cool and dry place away from hat. Ensure adequate ventilation ➢ Before welding operation, remove or shield the flammable material properly ➢ Store flammable materials in stable racks, correctly labeled preferably with catchments trays. ➢ Wipe off the spills immediately

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	➢ Short circuiting of electrical system	➢ Same as above ➢ Can cause Electrocution	➢ Don't lay wires under carpets, mats or door ways ➢ Use one socket for one appliance ➢ Use only fully insulated wires or cables ➢ Do not allow open/bare connections ➢ Provide all connections through ELCB ➢ Ensure earthing of machineries and equipments
(H) VEHICULAR MOVEMENT	➢ Crossing the Speed Limits (Rash driving)	➢ Personal injury	➢ Obey speed limits and traffic rules strictly ➢ Always expect the unexpected and be a defensive drive ➢ Use sat belts/helmets ➢ Blow horn at intersections and during overtaking operations. ➢ Maintain the vehicle in good condition ➢ Do not overtake on curves, bridges and slopes
	➢ Adverse weather condition	➢ Same as above	➢ Read the road ahead and ride to the left ➢ Keep the wind screen and lights clean ➢ Do not turn at speed ➢ Recognize the hazard, understand the defense and act correctly in time.
	➢ Consuming alcohol before and during he	➢ Same as above	➢ Alcohol and driving do not mix well. Either choose

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ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
	driving operation		alcohol or driving. ➢ If you have a choice between hitting a fixed object or an oncoming vehicle, hit the fixed object ➢ Quit the steering at once and become a passenger. Otherwise take sufficient rest and then drive. ➢ Do not force the driver to drive fast and round the clock ➢ Do not day dram while driving
	➢ Falling objects / Mechanical failure	➢ May prove fatal	➢ Ensure effective braking system, adequate visibility for the drives, reverse warning alarm. ➢ Proper maintenance of the vehicle as per manufacturer instructions
(I) PROOF TESTING (HYDROSTATIC/ PNEUMATIC TESTING	➢ Bursting of piping ➢ Collapse of tanks ➢ Tanks flying off	➢ May cause injury and prove fatal	➢ Prepare test procedure & obtain CONSULTANT/ Owner's approval ➢ Provide separate gauge for pressurizing pump and piping/equipment ➢ Check the calibration status of all pressure gauges, dead weight testers and temperature recorders ➢ Take dial readings at suitable defined intervals and ensure most of them fall between 40-60% of the gauge scale range ➢ Provide safety relief valve (set at

ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			pressure slightly higher than test pressure) while testing with air/nitrogen ➢ Ensure necessary precautions, stepwise increase in pressure, tightening of bolts/ nuts, grouting, etc. before and during testing ➢ Keep the vents open before opening any valve while draining out of water used for hydro testing of tanks ➢ Pneumatic testing involves the hazard of released energy shored in compressed gas. Specific care must therefore be taken to minimize the chance of brittle failure during a pneumatic leak test. Test temperature is important in this regard and must be considered when the designer chooses the material of construction ➢ A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 345 KPa (50 psi) or 10% of he test pressure. The gas used as test fluid, if not air, shall be nonflammable and nontoxic.
(J) WORKING AT HEIGHTS	➢ Person can fall down	➢ May sustain severe injuries or	➢ Provide guard rails/barricade at the

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ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
		prove fatal	work place ➢ Use PPE like safety belts, full body harness, life line, helmets, safety shoes, etc. ➢ Obtain a permit before starting the work at height above 3 meters ➢ Fall arrest systems like safety nets, etc. must be installed ➢ Provide adequate working space (min. 0.6 m) ➢ Tie/weld working platform with fixed support ➢ Use roof top walk ladder while working on a slopping roofs ➢ Avoid movement on beams
		➢ May hit the scrap / material stacked at the ground or in between	➢ Keep the work place neat and clean ➢ Remove the scrap immediately
	➢ Material can fall down	➢ May hit the workers working at lower levels and prove fatal.	➢ Same as above plus ➢ Do not throw or drop material or equipment from height ➢ All tools to be carried in a toolkit bags or on working uniform ➢ Remove scrap from the planks ➢ Ensure wearing of helmet by the workers at low level
(K) CONFINED SPACES	➢ Suffocation / drowning	➢ Unconsciousness, death	➢ Use respiratory devices, if required ➢ Avoid over crowding inside a confined space ➢ Provide Exhaust Fans for ventilation ➢ Do not wear loose clothes, neck ties,

ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			etc. ➢ Fulfill conditions of the permit. ➢ Check for presence of hydrocarbons, O_2 level ➢ Obtain work permit before entering a confined space ➢ Ensure that the connected piping of the equipment which is to be opened is pressure free, fluid has been drained, vents are open and piping is positively isolated by a blind flange
	➢ Presence of foul smell and toxic substances	➢ Inhalation can pose threat to life.	➢ Same as above plus ➢ Check for hydrocarbon and Aromatic compounds before entering a confined space ➢ Depute one person outside the confined space for continuous monitoring and for extending help in case of an emergency
	➢ Ignition / flame can cause fire	➢ Person may sustain burn injuries or explosion may occur	➢ Keep fire extinguishers at a hand distance ➢ Remove surplus material and scrap immediately ➢ Do not smoke inside a confined space ➢ Do not allow gas cylinders inside a confined space ➢ Use low voltage (24V) lamps for lighting ➢ Use tools with air motors or electric tools with max.

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ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			➢ voltage of 24V ➢ Remove all equipments at the end of the day
(L) HANDLING AND LIFTING EQUPMENTS	➢ Failure of load lifting and moving equipments	➢ Can cause accident and prove fatal	➢ Avoid standing under the lifted load and within the operating radius of cranes ➢ Check periodically oil, brakes, gears, horns and tyre pressure of all moving machinery ➢ Check quality, size and condition of all chain pulley blocks, slings, U-clamps, D-shackles, wire ropes, etc. ➢ Allow crane to move only on hard, firm and leveled ground ➢ Allow lifting slings as short as possible and check gunny packings at the friction points ➢ Do not allow crane to tilt its boom while moving ➢ Install Safe Load Indicator ➢ Ensure certification by applicable authority.
	➢ Overloading of lifting equipments	➢ Can cause electrocution and fire	➢ Safe lifting capacity of derricks and winches written on them shall be got verified. ➢ The max safe working load shall be marked on all lifting equipments ➢ Check the weight of columns and other heavy items painted on them and accordingly decide about the crane

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ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			capacity, boom and angle of erection ➢ Allow only trained operators and riggers during crane operation
	➢ Overhead electrical wires	➢ Can cause electrocution and fire	➢ Do not allow boom or other parts of crane to come within 3 m reach of overhead HT cables ➢ Hook and load being lifted shall preferably remain in full visibility of crane operator.
(M) SCAFFOLDING, FORMWORK AND LADDERS	➢ Person can fall down	➢ Person may sustain severe injuries and prove fatal	➢ Provide guard rails for working at height ➢ Face ladder while climbing and use both hands ➢ Ladders shall extend about 1m above landing for easy access and tying up purpose ➢ Do not place ladders against movable objects and maintain base at ¼ unit of the working length of the ladder ➢ Suspended scaffolds shall not be less than 500 mm wide and tied properly with ropes ➢ No loose planks shall be allowed ➢ Use PPE, like helmets, safety shoes, etc.
	➢ Failure of scaffolding material	➢ Same as above	➢ Inspect visually all scaffolding materials for stability and anchoring with permanent structures. ➢ Design scaffolding

ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
			for max. load carrying capacity ➢ Scaffolding planks shall not be less than 50x250 mm full thickness lumber or equivalent. These shall be cleared or secured and must extend over the end supports by at least 150mm and not more that 300 mm ➢ Don't overload the scaffolds ➢ Do not splice short ladders to make a longer one. Vertical ladders shall not exceed 6m.
	➢ Material can fall down	➢ Persons working at lower level gets injured.	➢ Remove excess material and scrap immediately ➢ Carry the tools in a tool-kit bag only ➢ Provide safety nets
(N) STRUCTURAL WORKS	➢ Personal negligence and danger of fall	➢ Can cause injury or casualty	➢ Do not take rest inside rooms built for welding machines or electrical distribution system ➢ Avoid walking on beams at height ➢ Wear helmet with chin strap and safety belts when working at height ➢ Use hand gloves and goggles during grinding operations ➢ Cover or mark the sharp and projected edges ➢ Do not stand within the operating radius of cranes
	➢ Lifting / slipping of	➢ Same as above	➢ Do not stand under the lifted load

ACTIVITY	*TYPE OF HAZARD*	EFFECT OF HAZARD	PREVENTIVE MEASURES
	material		➢ Stack properly all the materials. Avoid slippage during handling ➢ Control longer pieces lifted up by cranes from both ends ➢ Remove loose materials from height ➢ Ensure tightening of all nuts and bolts
(O) PIPELINE WORKS	➢ Erection / lowering failure	➢ Can cause injury	➢ Do not stand under the lifted Load ➢ Do not allow any person to come within the radii of the side boom handling pipes ➢ Check the load carrying capacity of the lifting tools and tackles ➢ Use safe Load Indicators ➢ Use appropriate PPEs
	➢ Other	➢ Same as above	➢ Wear gum boots in marshy areas ➢ Allow only one person to perform signaling operations while lowering of pipes ➢ Provide night caps on pipes ➢ Provide end covers on pipes for stoppage of pigs while testing/cleaning operations.

FORMAT NO. : HSE-1, REV. 0

HSE CHECKLIST CUM COMPLIANCE REPORT (1/6)

Project: _____ Contractor :_____
Date: _____ Owner :_____
Inspection By:_____ Report No. :_____
Frequency : Fortnightly Job No :_____

Note: write 'NA' wherever the item is not applicable

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
1	**HOUSEKEEPING**				
a)	Waste containers provided and used				
b)	Sanitary facilities adequate and clean				
c)	Passageways and Walkways clear				
d)	General neatness of working areas				
e)	Others				
2	**PERSONNEL PROTECTIVE EQUIPMENT**				
a)	Goggles; Shields				
b)	Face protection				
c)	Hearing protection				
d)	Safety shoes				
e)	Hand protection				
f)	Respiratory Masks etc.				
g)	Safety Belts				
h)	Safety Helmet/Hard Hat				
I)	Others				
3	**EXCAVATIONS/OPENINGS**				
a)	Openings properly covered or barricaded				
b)	Excavations shored				
c)	Excavations barricaded				
d)	Overnight lighting provided				
e)	Others				
4	**WELDING & GAS CUTTING**				
a)	Gas cylinders chained upright				
b)	Cables and hoses not obstructing				
c)	Screens or shields used				
d)	Flammable materials protected				
e)	Fire extinguisher(s) accessible				
f)	Others				
5	**SCAFFOLDING**				
a)	Fully decked platforms				
b)	Guard and intermediate rails in place				

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
c)	Toe boards in place				
d)	Adequate shoring				
e)	Adequate access				
f)	Others				
6	**LADDERS**				
a)	Extension side rails 1m above				
b)	Top of landing				
c)	Properly secured				
d)	Angle + 70 from horizontal				
e)	Others				
7	**HOISTS, CRANES AND DERRICKS**				
a)	Condition of cables and sheaves OK				
b)	Condition of slings, chains, hooks and eyes OK				
c)	Inspection and maintenance logs maintained				
d)	Outriggers used				
e)	Signs/barricades provided				
f)	Signals observed and understood				
g)	Qualified operators				
h)	Others				
8	**MACHINERY, TOOLS AND EQUIPMENT**				
a)	Proper instruction				
b)	Safety devices				
c)	Proper cords				
d)	Inspection and maintenance				
e)	Others				
9	**VEHICLE AND TRAFFIC**				
a)	Rules and regulations observed				
b)	Inspection and maintenance				
c)	Licensed drivers				
d)	Others				
10	**TEMPORARY FACILITIES**				
a)	Emergency instructions posted				
b)	Fire extinguishers provided				
c)	Fire-aid equipment available				
d)	Secured against storm damage				
e)	General neatness				
f)	In accordance with electrical requirements				
g)	Others				
11	**FIRE PREVENTION**				
a)	Personnel instructed				
b)	Fire extinguishers checked				
c)	No smoking in Prohibited Areas				
d)	Hydrants Clear				

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
e)	Others				
12	**ELECTRICAL**				
a)	Use of 3-core armoured cables				
b)	Usage of 'All insulated' or 'double insulated' electrical tools				
c)	All electrical connection are routed through ELCB				
d)	Natural Earthing at the source of power (main DB)				
e)	Continuity and tightness of earth conductor				
f)	Covering of junction boxes, panels and other energized wiring places				
g)	Ground fault circuit interrupters provided				
h)	Prevention of tripping hazards				
i)	Others				
13	**HANDLING AND STORAGE OF MATERIALS**				
a)	Properly stored or stacked				
b)	Passageways clear				
c)	Others				
14	**FLAMMABLE GASES AND LIQUIDS**				
a)	Containers clearly identified				
b)	Proper storage				
c)	Fire extinguishers nearby				
d)	Others				
15	**WORKING AT HEIGHT**				
a)	Erection plan and work permit obtained				
b)	Safety nets				
c)	Full body harness and lanyards; chute lines				
d)	Health Check record available for workers going up?				
e)	Others				
16	**CONFINED SPACE**				
a)	Work permit obtained				
b)	Test for toxic gas and sufficient availability of oxygen conducted				
c)	At least one person outside the confined space for monitoring deputed				
d)	Availability of sufficient means of entry, exit and ventilation				
e)	Fire extinguishers and first-aid facility ensured				
f)	Lighting provision made by using 24V lamps				
g)	Proper usage of PPEs ensured				
17	**RADIOGRAPHY**				
a)	Proper storage and handling of source as per BARC / AREB guidelines				
b)	Working permit obtained				
c)	Cordoning of the area done				

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
d)	Use of appropriate PPE's ensured				
e)	Proper training to workers/supervisors imparted				
f)	Minimum occupancy of workplace ensured				
18	**HEALTH CHECKS**				
a)	Workers medically examined and found to fit for working : i) At heights ii) In confined space.				
b)	Availability of First-aid facilities				
c)	Proper sanitation at site, office and labour camps				
d)	Arrangement of medical facilities				
e)	Measures for dealing with illness				
f)	Availability of Portable drinking water for workmen & staff				
g)	Provision of crèches for children				
h)	Stand by vehicle available for evacuation of injured.				
19	**ENVIRONMENT**				
a)	Chemical and other effluents properly disposed				
b)	Cleaning liquid of pipes disposed off properly				
c)	Seawater used for hydro-testing disposed off as per agreed procedure				
d)	Lubricant Waste/Engine oils properly disposed				
e)	Waste from Canteen, offices, sanitation etc. disposed properly				
f)	Disposal of surplus earth, stripping materials, oily rags and combustible materials done properly				
g)	Green belt protection				

Signature of Resident Engineer with Seal

FORMAT NO. : HSE-2, REV. 0

ACCIDENT / INCIDENT REPORT

(To be submitted by Contractor after every Accident / Incident within 24 hours)

Report No:_____
Date: _____

Name of Site:-_____
CONTRACTOR_____

Type of Accident / Incident : ☐ Fatal ☐ Other Lost Time ☐ Non Loss Time ☐ First-Aid case

NAME OF THE INJURED……
AGE …….
FATHER'S NAME……..
SUB-CONTRACTOR M/S……..
DATE & TIME OF ACCIDENT……
LOCATION ……

BRIEF DESCRIPTION OF ACCIDENT

CAUSE OF ACCIDENT

NATURE OF INJURY/DAMAGE

MEDICAL AID PROVIDED/ACTIONS TAKEN

INTIMATION TO LOCAL AUTHORITIES (IF APPLICABLE)

DATE: SIGNATURE OF CONTRACTOR WITH SEAL

To : OWNER…….. 1 COPY
: RCM/SITE-IN-CHARGE, Consultant 3 COPIES

→ Divisional Head (Constn.) through RCM
→ Project Manager Consultant, through RCM

FORMAT NO. : HSE-3, REV. 0

SUPPLEMENTARY ACCIDENT / INCIDENT INVESTIGATION REPORT

Supplementary to Report No: _____(Copy enclosed)

Project:_____ Site:_____
Name of Work :_____ Date:_____
Contractor:_____ Work Order / LOI No. :_____

NAME OF THE INJURED …….
AGE : ……...
SUB-CONTRACTOR M/S……...
DATE & TIME OF ACCIDENT / INCIDENT ……
LOCATION……

BRIEF DESCRIPTION & CAUSE OF A ACCIDENT/ INCIDENT

NATURAL OF INJURY/DAMAGE

COMMENTS FROM MEDICAL PRACTITIONER WHO ATTENDED THE VICTIM/INJURED

SUGGESTED IMPROVEMENT IN THE WORKING CONDITION IF ANY

LOSS OF MANHOURS AND IMPACT ON SITE WORKS

ANY OTHER COMMENT BY SAFETY OFFICER.

DATE: SIGNATURE OF CONTRACTOR WITH SEAL

To : OWNER…….. 1 COPY
: RCM/SITE-IN-CHARGE, Consultant 3 COPIES

→ Divisional Head (Constn.) through RCM
→ Project Manager Consultant, through RCM

FORMAT NO. : HSE-4, REV. 0

NEAR MISS INCIDENT – SUGGESTED PROFORMA

Report No: _____

Name of Site :_____ Date :_____

Name of Work :_____ Contractor :_____

INCIDENT REPORTED BY :

DATE & TIME OF INCIDENT :

LOCATION :

BRIEF DESCRIPTION OF INCIDENT

PROBABLE CAUSE OF INCIDENT

SUGGESTED CORRECTIVE ACTION

STEPS TAKEN TO AVOID RECURRENCE YES ☐ NO ☐

DATE: SIGNATURE OF CONTRACTOR WITH SEAL

To : OWNER…….. 1 COPY

: RCM/SITE-IN-CHARGE, Consultant 3 COPIES

→ Divisional Head (Constn.) through RCM

→ Project Manager Consultant, through RCM

FORMAT NO. : HSE-5, REV. 0

MONTHLY HEALTH, SAFETY & ENVIRONMENT (HSE) REPORT
(To be submitted by each Contractor)

Actual work start Date:_____ For the Month of:_____
Project:_____ Report No:_____
Name of the Contractor:_____ Status as on:_____
Name of Work:_____ Name of Safety officer:_____

ITEM			UPTO PREVIOUS MONTH	THIS MONTH	CUMU-LATIVE
a)	Average number of Staff & Workmen (average daily headcount, not man days)				
b)	Manhours Worked				
c)	Number of HSE meeting organized at site				
d)	Number of HSE awareness programmes conducted at site				
e)	Number of Lost Time Accidents (LTA)	Fatal			
		Other LTA			
f)	Number of Loss time Injuries (LTI)	Fatalities			
		Other LTI			
g)	Number of Loss Time Accidents				
h)	Number of First Aid Cases				
i)	Number of Near Miss Incidents				
j)	Man-days lost due to accidents				
k)	LTA Free Manhours i.e. Number of LTA free manhours from the Lst LTA				
l)	Compensation cases raised with Insurance				
m)	Compensation case resolved and paid to workmen				
n)	Whether workmen compensation policy taken		Y/N		
o)	Whether workmen compensation policy valid		Y/N		
p)	Whether workmen registered under ESI Act		Y/N		
Remark					

DATE:

Safety Officer /Resident Engineer
(Signature and Name)

To : OWNER
: RCM/, Consultant (2 COPIES)

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FORMAT NO. : HSE-6, REV. 0

PERMIT FOR WORKING AT HEIGHT (ABOVE 2 METER)

Project Site : …… Sr. No.: ……
Name of the work: …… Date: ……
Name of Contractor : …….. Nature of Work : ……
Total No.of Workers: …….. Exact location of work : ……
Duration of work: from ..…… to ……

The following items have been checked and compliance shall be ensured during the currency of the permit:

Sl.	ITEM	DONE	NOT REQD.
1.	Equipment/Work Area inspected	☐	☐
2.	Considered hazard from other routine/non-routine operations and concerned person alerted	☐	☐
3.	ELCB provided	☐	☐
4.	Proper lighting provided	☐	☐
5.	Area cordoned off.	☐	☐
6.	Precautions against public traffic taken	☐	☐
7.	Sound Scaffolding provided	☐	☐
8.	Adequate protected Platform provided	☐	☐
9.	Acces and Exit to the area (Ladder properly fixed)	☐	☐
10.	Floor Openings covered	☐	☐
11.	Safety Net provided	☐	☐
12.	Heath check of personnel	☐	☐

A. Following personal protective equipment are provided (mark) and used as relevant Safety helmet/Gloves/Goggles/Shoes/Face Shield/Life Line/Safety Belt/Safety Harness.

B. This permit shall be available at the work site at all times.

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C. Permit shall be issued for maximum one week only (Monday to Sunday).

D. This permit shall be applicable in non-operational areas.

E. After completion of the work, used permits shall be preserved for record purposes.

F. Additional precautions, if any …….

Permission is granted to work (See overleaf) = Yes/No

Name of Contractor's Supervisor (Initiator)

Name of Contractor's Safety Officer (Issuing Authority)

GRANT OF PERMIT AND EXTENSIONS

Sl. No.	Validity Period From …… To ……	Work time From …..Hrs. To …….Hrs.	Initiator (Supervisor of Contractor)	Issuing Authority (Safety Officer) of Contractor	Verification by CONSULTANT with date

Additional safety instructions, if any.

FORMAT NO. : HSE-7, REV. 0

CONFINED SPACE ENTRY PERMIT

Project Site : …… Sr. No.: ……
Name of the work: …… Date: ……
Name of Contractor : …….. Nature of Work : ……
Exact location of work : ……

Safety Requirements : POSITIVE ISOLATION OF THE VESSEL IS MANDATORY

(A) Has the equipment been ?

Y	NR		Y	NR		Y	NR	
☐	☐	isolated from power / steam / air	☐	☐	water flushed &/or steamed	☐	☐	radiation sources removed
☐	☐	isolated from liquid or gases	☐	☐	Manways open & ventilated	☐	☐	Proper lighting provided
☐	☐	depressurized &/or drained	☐	☐	cont. inset gas flow arranged	☐	☐	
☐	☐	blanked / blinded / disconnected	☐	☐	adequately cooled	☐	☐	

(B) Expected Residual Hazards

Y	NR		Y	NR		Y	NR	
☐	☐	lack of O_2	☐	☐	combustible gas / liquid	☐	☐	H_2S / toxic gases
☐	☐	corrosive chemicals	☐	☐	pyrophoric iron / scales	☐	☐	electricity / static
☐	☐	Heat / stream / frost	☐	☐	high humidity	☐	☐	ionizing radiation
☐	☐		☐	☐		☐	☐	

(C) Protective Measures

Y	NR		Y	NR		Y	NR	
☐	☐	gloves	☐	☐	ear plug / muff	☐	☐	goggles / face shield
☐	☐	protective clothing	☐	☐	dust / gas / air line mask	☐	☐	personal gas alarm
☐	☐	Grounded air educater / blower / AC	☐	☐	attendant with SCBA / air mask	☐	☐	rescue equipment / team
☐	☐	Fire fighting arrangements	☐	☐	safety harness & lifeline	☐	☐	communication equipment
☐	☐		☐	☐		☐	☐	

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Authorization / Renewal (It is safe to enter the confirmed space)

Date	No. of Persons Allowed	Name of Persons allowed	Signature		Time		Signature
			Contractor's Supervisor	Contractor's Safety Officer	From	To	Workman

Permit Closure :

(A) Entry □ was closed □ stopped □ will continue on

(B) □ Site left in a safe condition
□ Housekeeping done

(C) Multi lock □ removed □ key transferred
□ Ensured all men have come out □ Manways barricaded

Remarks, if any :

FORMAT NO. : HSE-8, REV. 0

RADIATION WORK PERMIT

Project : Sr. No.:

Name of the work : Date:

Name of Contractor : Job No. :

Location of work :

Source Strength :

Cordoned distance (m) :

Name of Radiographing agency : Approved by Owner / Consultant ☐

The following items have been checked & compliance shall be ensured during currency of the permit :

S. No.	Item Description	Done
1.	Safety regulations as per BARC/AERB ensured while source in use/ in transit & during storage.	☐
2.	Area cordoned off.	☐
3.	Lighting arrangements for working during nights ensured.	☐
4.	Warning signs / flash lights installed.	☐
5.	Cold work permit taken (if applicable)	☐
6.	PPEs like film badges, dosimeters used.	☐

Additional precautions, if any _____

(Radiography Agency's BARC / AREB authorized Supervisor) (Contractor's Safety Officer)

Permission is granted.

Permit is valid from _____ AM/PM _____ Date to _____ AM/PM _____ Date

(Signature of permit issuing authority)

Name : Designation : Date :

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Permit renewal :

Permit extended upto		Additional precautions required, if any.	Sign of issuing authority with date
Date	Time		

Work completed / stopped / area cleared at _____ Hrs. of Date _____

(Sign of permit issuing authority)
Name :

FORMAT NO. : HSE-9, REV. 0

RADIATION WORK PERMIT

Project : Sr. No.:

Name of the work : Date:

Name of Contractor : Job No. :

Name of Contractor :

Line No. / Equipment No. /Structure to be dismantled :

Location details of dismantling / demolition with sketch : (Clearly indicate the area)

The following items have been checked & compliance shall be ensured during currency of the permit :

S. No.	Item Description	Done	Not Applicable
1.	Services like power, gas supply, water, etc. disconnected.	☐	☐
2.	Dismantling / Demolishing method reviewed & approved.	☐	☐
3.	Usage of appropriate PPEs ensured.	☐	☐
4.	Precautions taken for neighboring structures	☐	☐
5.	First-Aid arrangements made	☐	☐
6.	Fire fighting arrangements ensured	☐	☐
7.	Precautions taken for blasting	☐	☐

(Contractor's Supervisor) (Contractor's Safety Officer)

Permission is granted.

(Permit issuing authority)
Name :
Date :

Completion Report :

Dismantling / Demolishing is completed on _____ Date at _____ Hrs.

Materials / debris transported to identified location ☐

Tagging completed (as applicable) ☐

Services like power, gas supply, water, etc. restored ☐

(Permit issuing authority)

DRAWINGS

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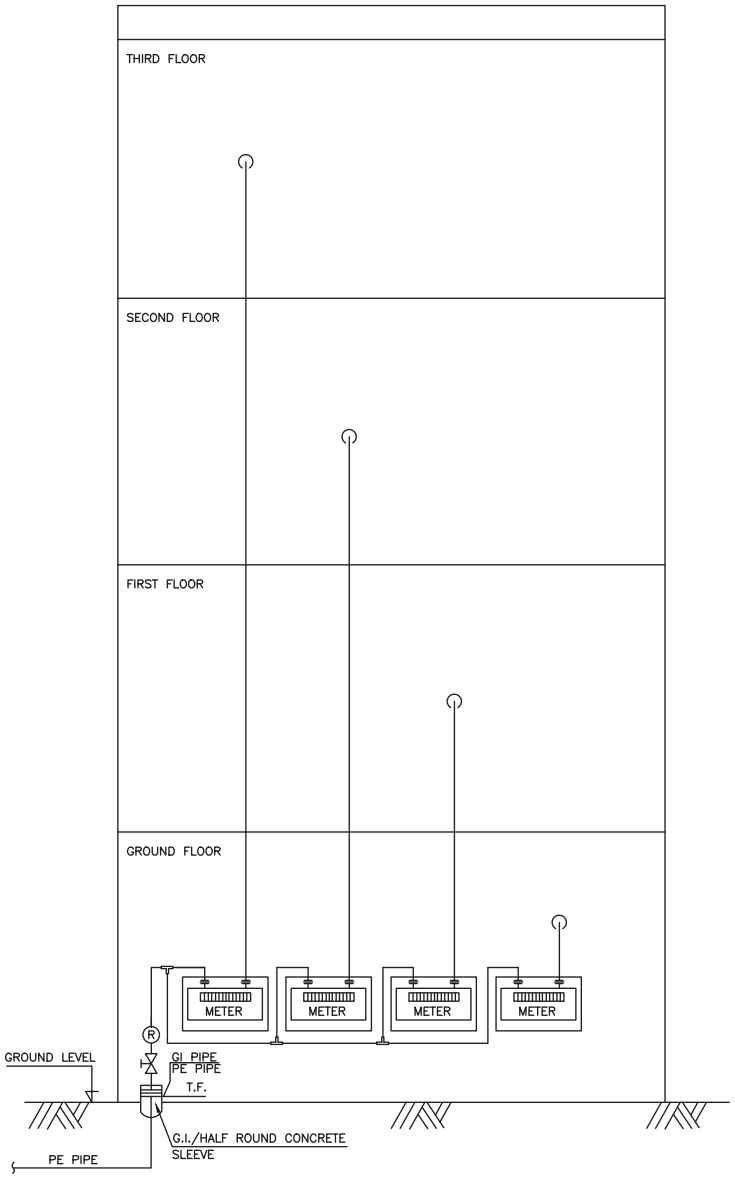

INDICATIVE RISER ARRANGEMENT IN BUILDING, IF METER IS INSTALLED AT GROUND FLOOR

NOTES:–

1. ALL DIMENSIONS ARE IN MM. UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE. IT SHALL BE DECIDED DURING DETAILS ENGINEERING.
3. PIPING DOWN STREAM METER SHALL BE OF COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5m. HOWEVER IT SHALL BE TAKEN APPROVAL FROM OWNER BEFORE STARTING THE EXECUTION.
5. IT SHALL BE DECIDED BY OWNER/OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THAN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR GI PIPE GOES TO THE APPLIANCE VALVE THAN GIFITTING SHALL BE USED AT THE OUTLET THE METER.
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10. AT THE TIME OF MEASURING LENGTH OG GI/COPPER PIPE, GI/CU FITTINGS SHALL BE COUNTED IN THE PIPE LENGTH.

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LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T 16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE : N.T.S. | SHEET 1 OF 3 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-01

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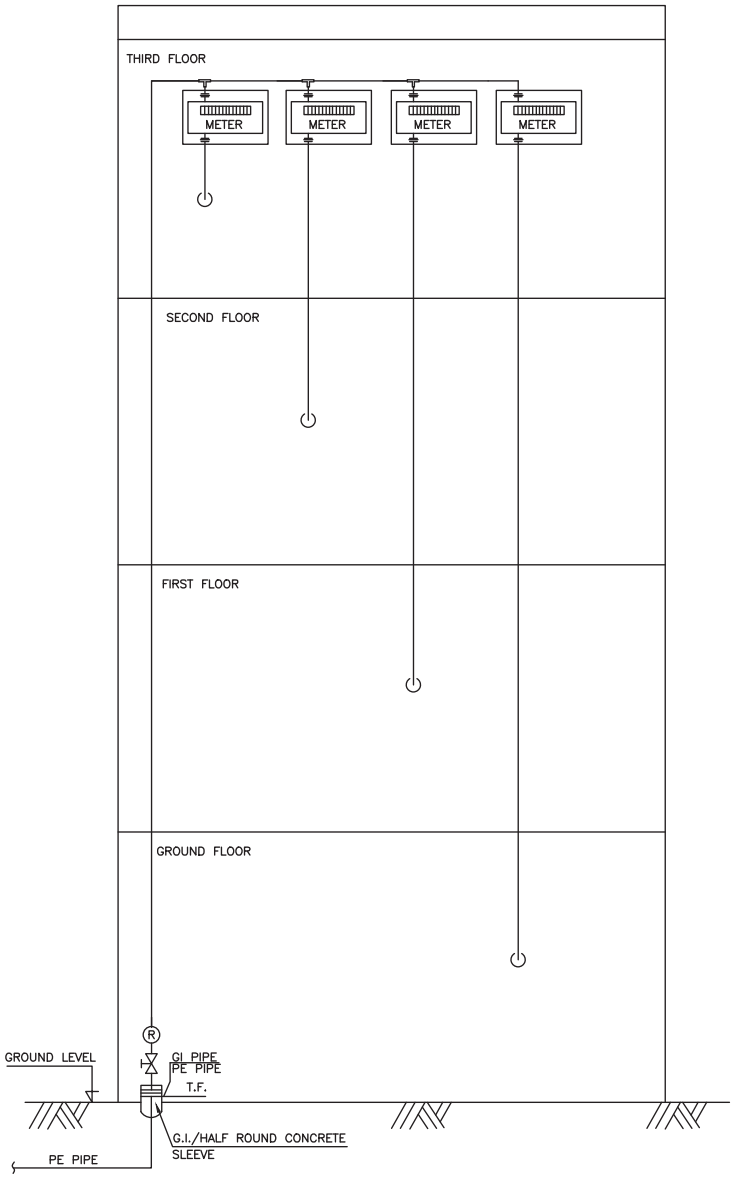

INDICATIVE RISER ARRANGEMENT IN BUILDING, IF METER IS INSTALLED AT TOP OF FLOOR

NOTES:-

1. ALL DIMENSIONS ARE IN MM. UNLESS NOTED OTHERWISE.
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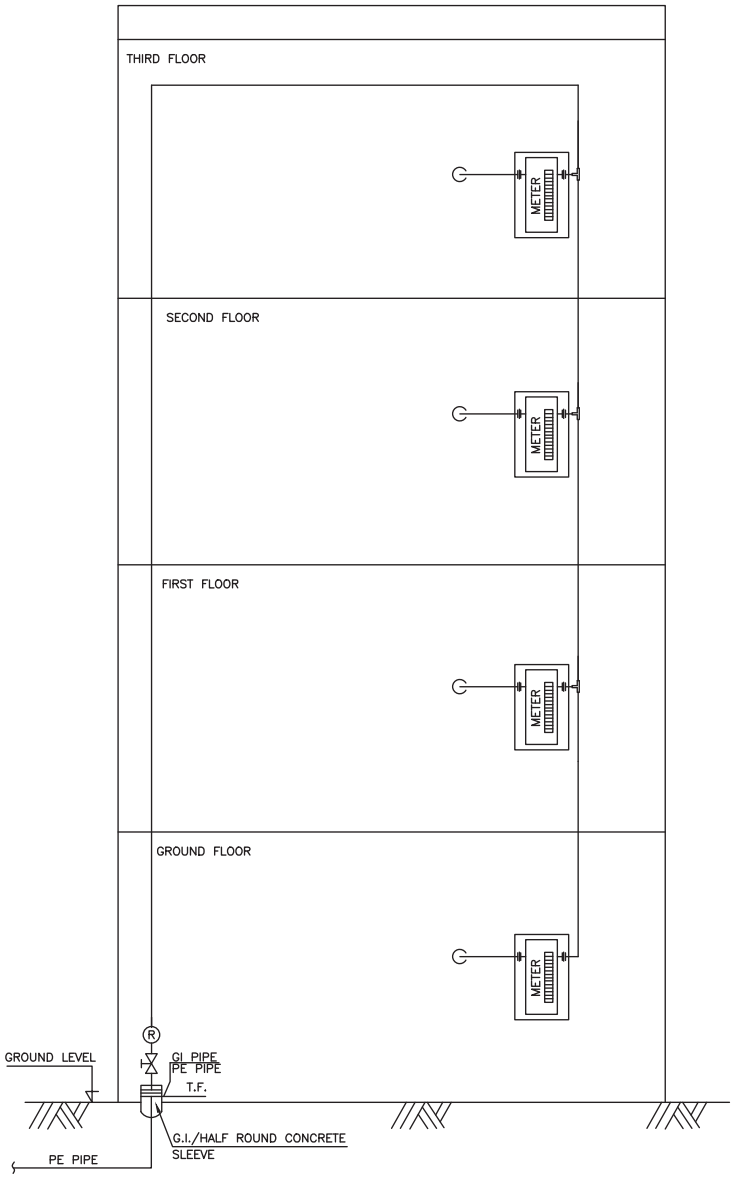
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE : N.T.S. | SHEET 2 OF 3 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-01



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CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE : N.T.S. | SHEET 3 OF 3 | REV. 0

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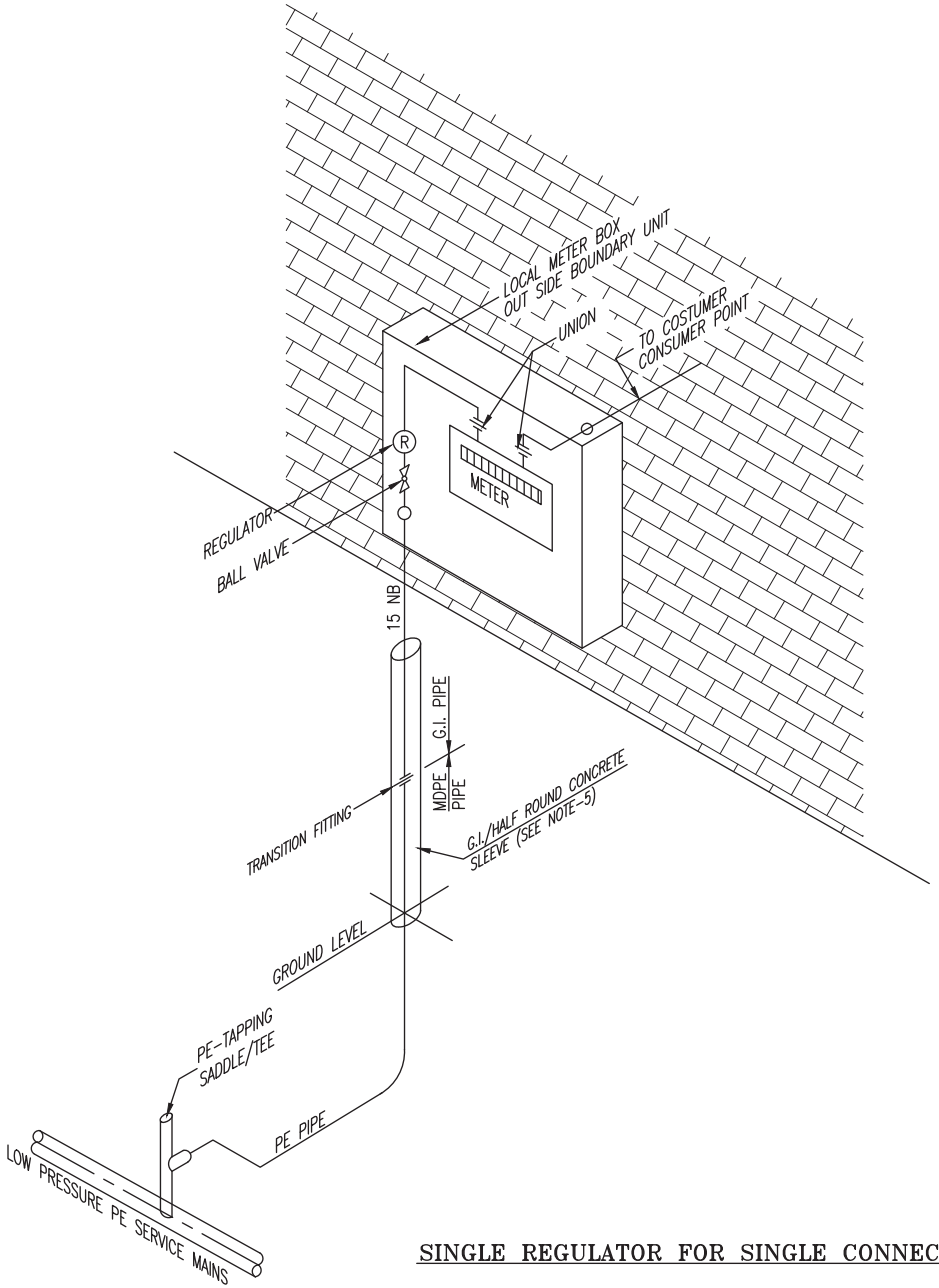

SINGLE REGULATOR FOR SINGLE CONNECTION

NOTES:-

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TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

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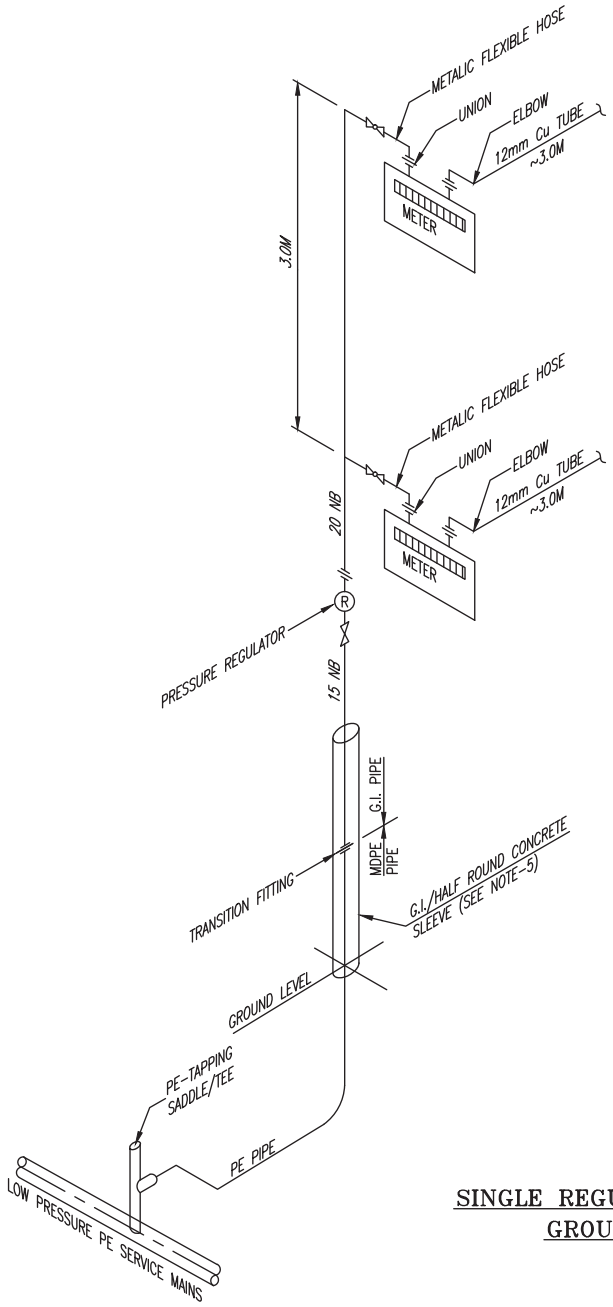

SINGLE REGULATOR & SINGLE CONNECTION ON GROUND FLOOR & FIRST FLOOR

NOTES:–

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			REVISION		

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TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

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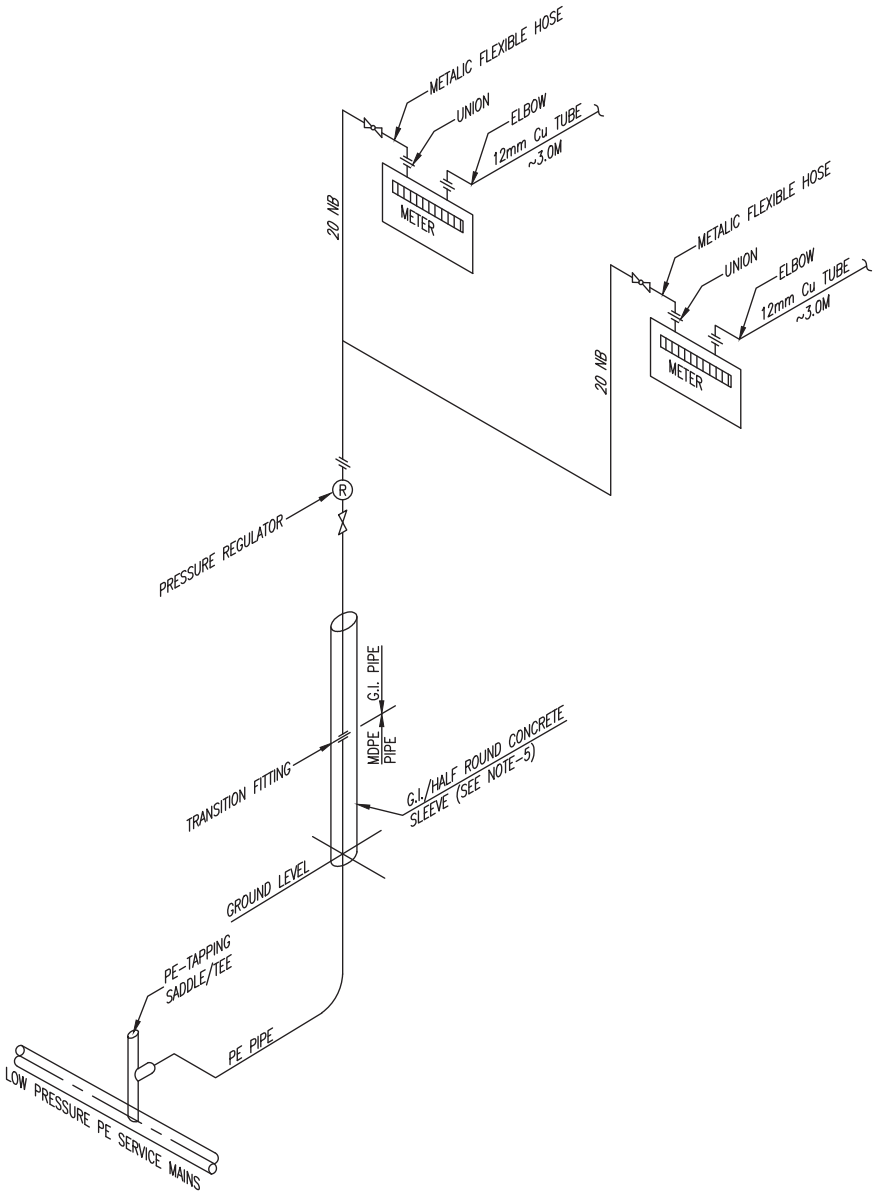

SINGLE REGULATOR & DOUBLE CONNECTION ON GROUND FLOOR

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3. PIPING DOWN STREAM METER SHALL BE OF COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5m. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVED FROM EIC.
5. G.I. INSTALLATION/METER INSTALLATION SHALL BE DECIDED BY OWNER/ OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
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7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING USE IN BETWEEN THE PIPE THAN CLAMP SHALL BE PLACED 150MM FAR AWAY FROM CENTER LINE OF FITTINGS AT EVERY SIDE. HOW EVER THE SAME MAY BE CHANGES AS PER SITE CONDITIONS/AS DIRECTED BY EIC.

FOR TENDER PURPOSE ONLY

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CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE : N.T.S. | SHEET 3 OF 6 | REV. 0

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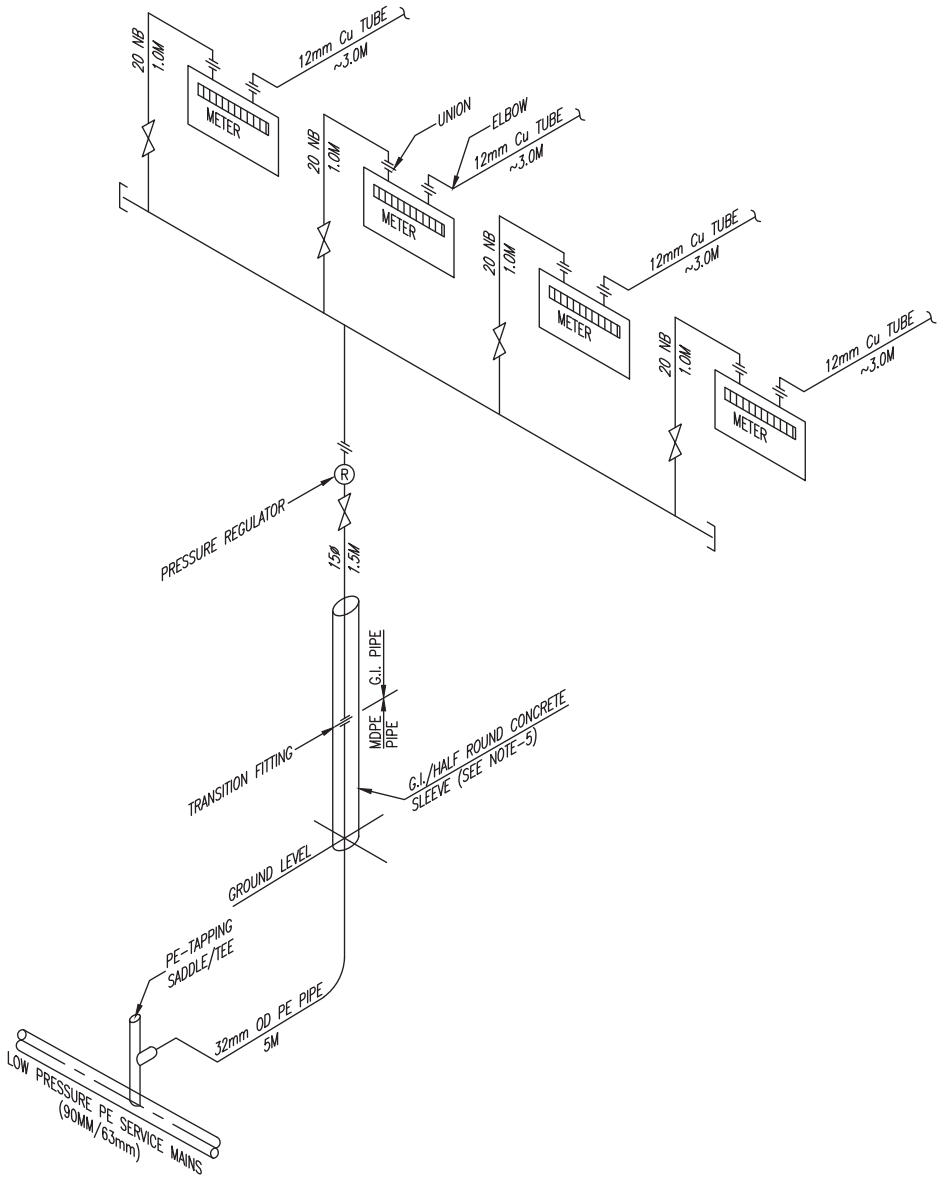
GAIL Internal



FOUR CONNECTION ON GROUND FLOOR

NOTES:–

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CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

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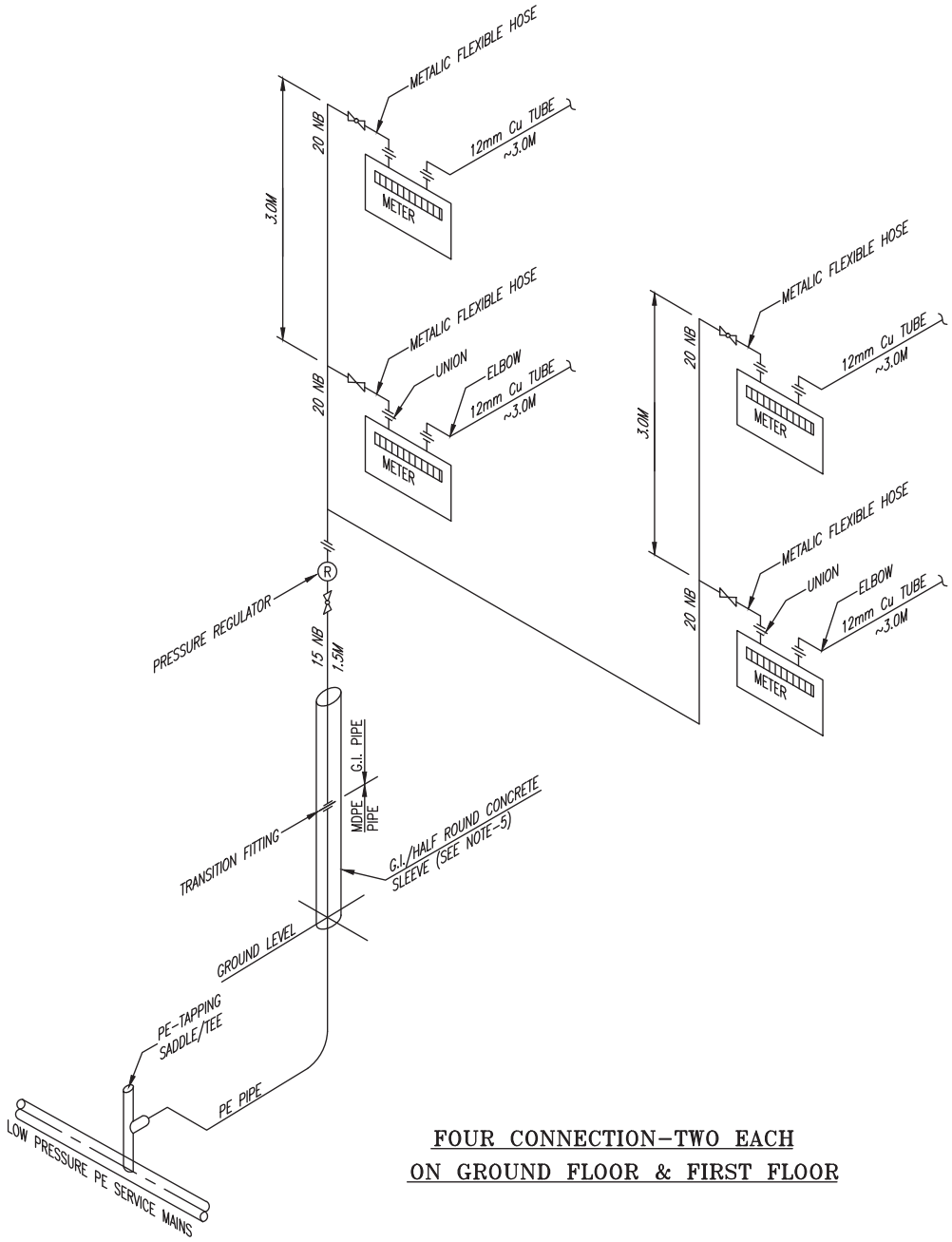

FOUR CONNECTION–TWO EACH
ON GROUND FLOOR & FIRST FLOOR

NOTES:–

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TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

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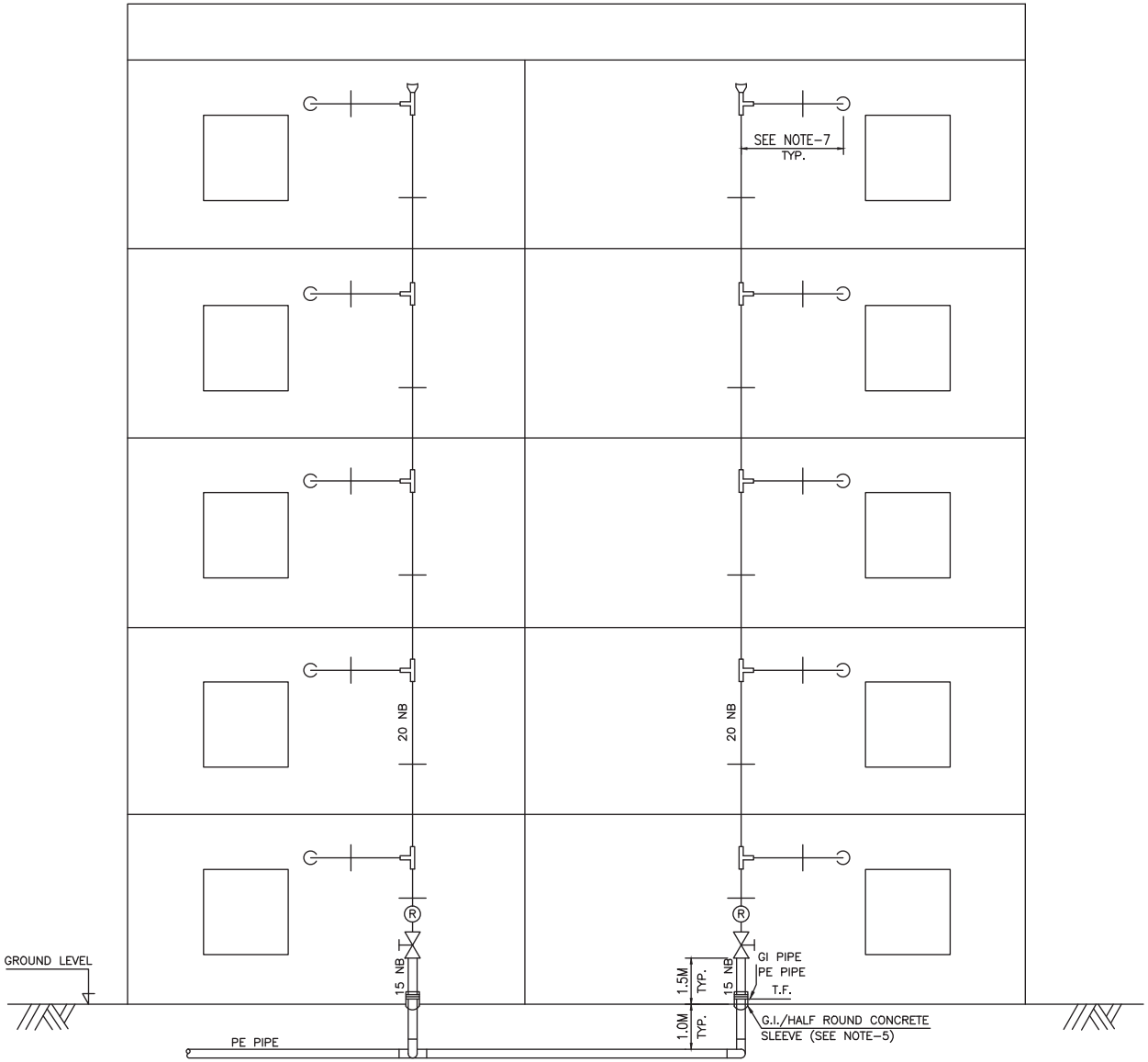

INDICATIVE RISER ARRANGEMENT IN GR+4 BUILDING (METER INSTALLED INSIDE THE KITCHEN)

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8. TAPPING SHALL BE LEFT NEAR THE OUTSIDE KITCHEN AS DIRECTED BY OWNER/OWNER'S REPRESENTATIVE.

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TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

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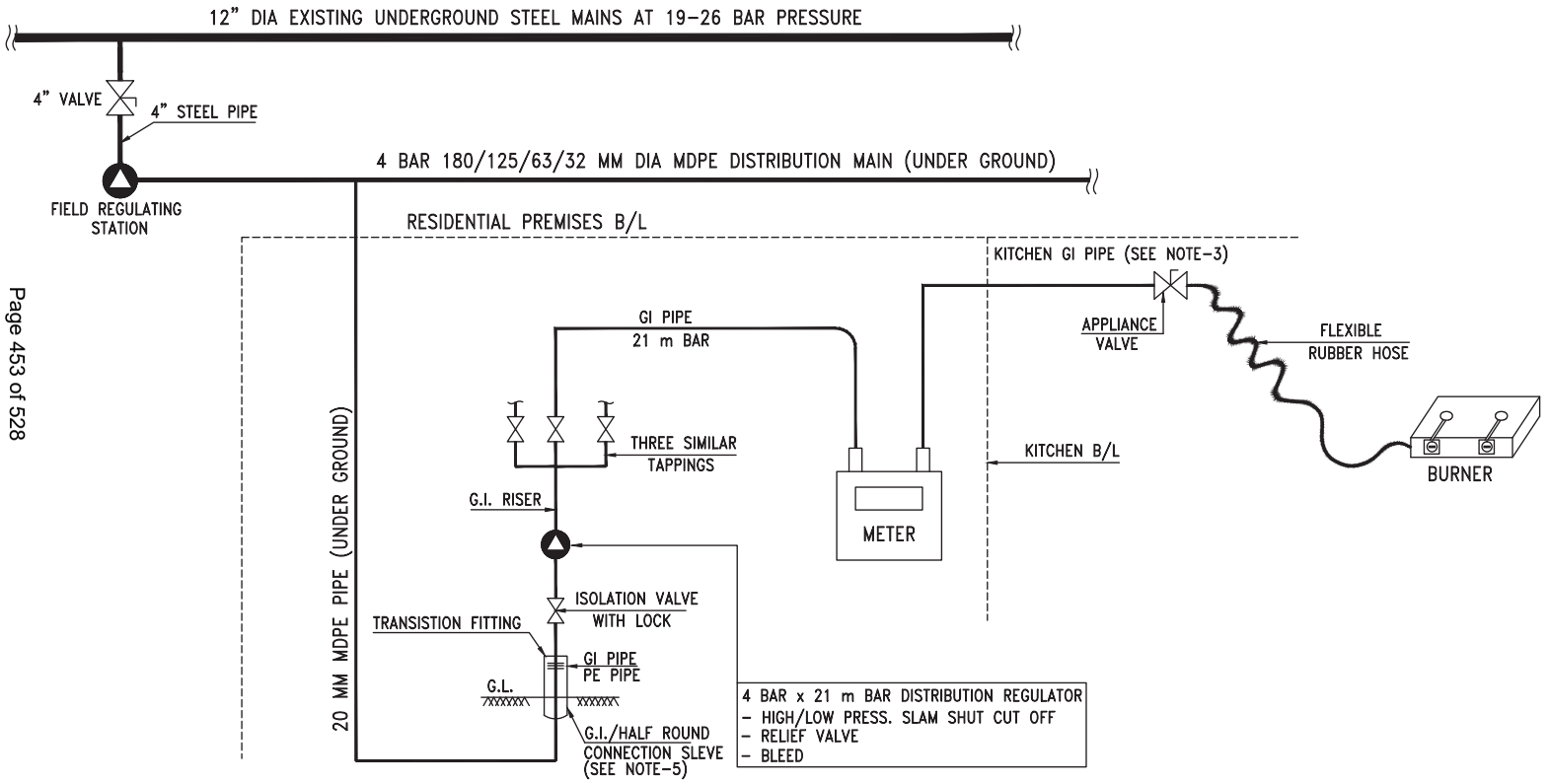
SCHEMATIC DRAWING FOR DOMESTIC CONNECTION



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SCHEMATIC DIAGRAM FOR DOMESTIC PNG CONSUMER CONNECTION

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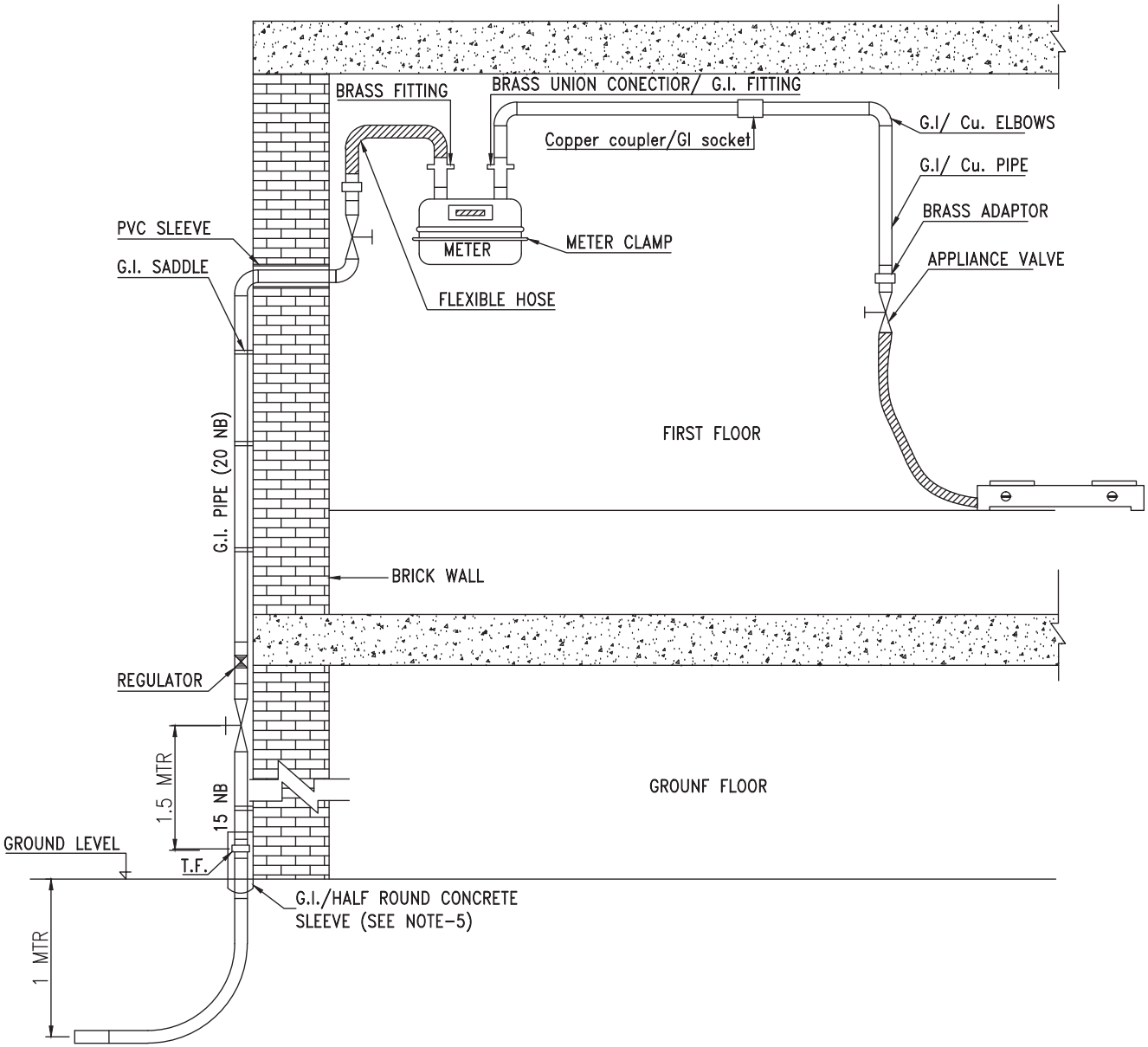
DRG. NO.- BR-CGD-STD-DWG-03



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8. METER CLAMP SHALL BE APPROVED FROM OWNER/OWNER'S REPRESENTATIVE.

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CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL NATURAL GAS INSTALLATION INSIDE KITCHEN

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

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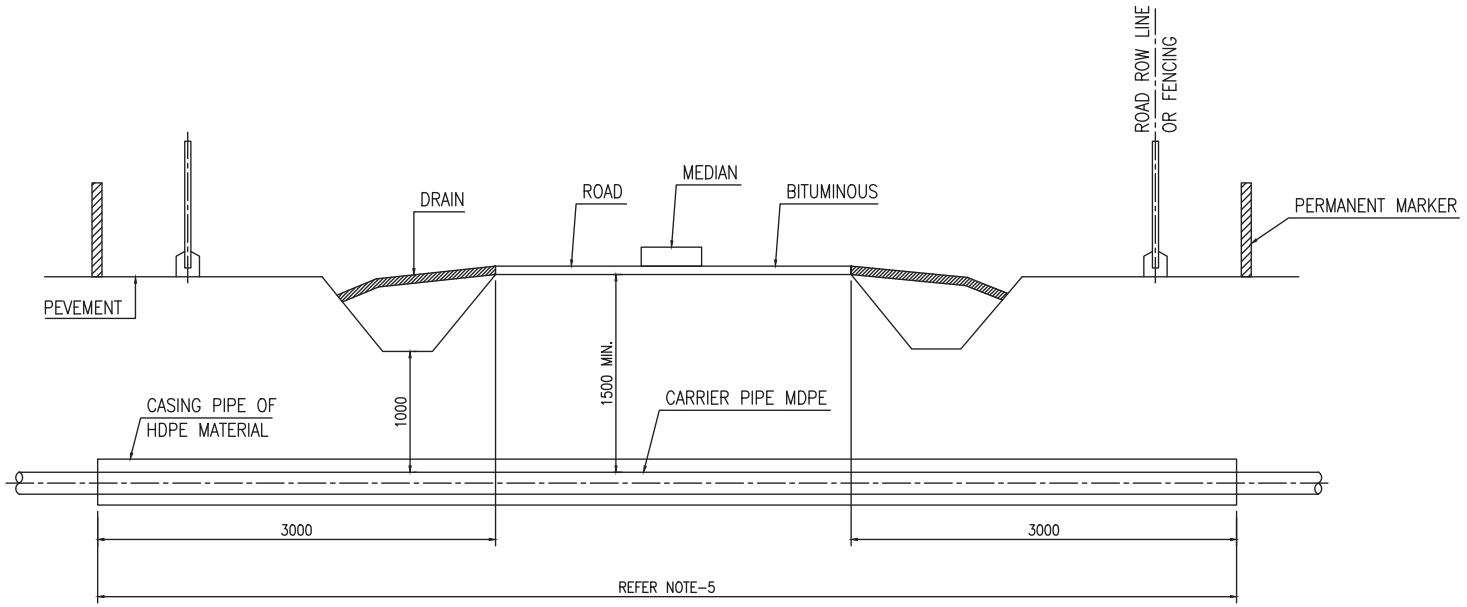

TYPICAL SECTION

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. ROAD HIGHWAY CROSSING SHALL BE RESTORED TO ORIGINAL CONDITION TO THE ENTIRE SATISFACTION OF OWNER AND CONCERNED AUTHORITIES HAVING CORISDICTION.
3. REFER API RP 1102 FOR OTHER DESIGN AND INSTALLATION REQUIREMENTS.
4. ANGLE OF INTERSECTION BETWEEN PIPELINE AND THE ROAD/ HIGHWAY SHALL BE AS CLOSED TO 90° AS POSSIBLE BUT IN NO CASE LESS THAN 30°.
5. CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS WITH RESPECT TO SURVEY DETAILS OF EACH ROAD/HIGHWAY CROSSING AND PREPARE DETAILED DRAWINGS FOR INDIVIDUAL CROSSING TAKE ENGINEER-IN-CHARGE AND CLIENTS APPROVAL BEFORE COMMERNCEMENT OF CONSTRUCTION.
6. THE CASING PIPE SHALL BE OF SIZE MAINTAINED AT CLAUSE NO.19 OF TECHNICAL SPECIFICATION FOR PE LAYING.

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CNG & CITY GAS DISTRIBUTION PROJECT

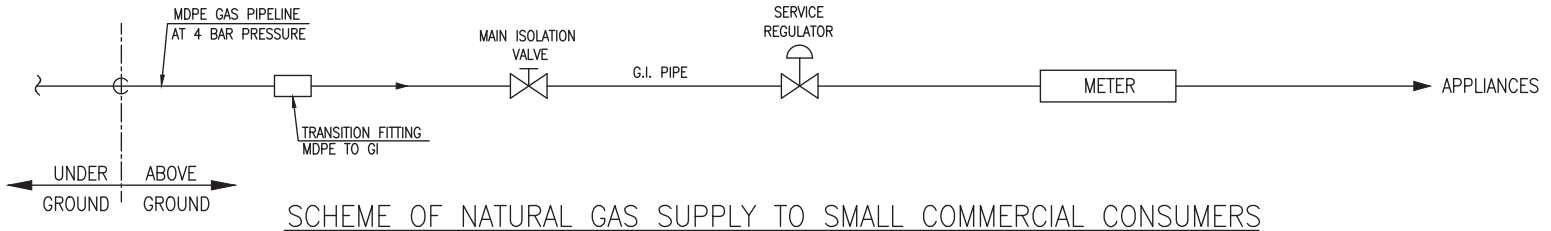
ROAD/HIGHWAY CASED CROSSING FOR MDPE PIPE

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

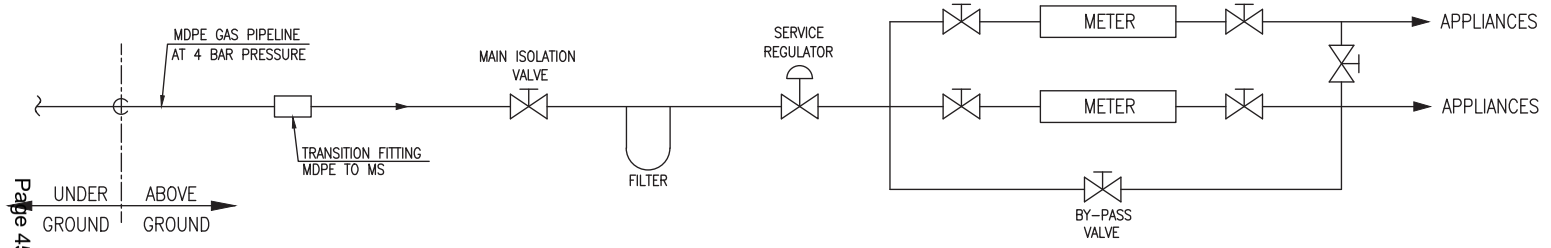
DRG. NO.- BR-CGD-STD-DWG-05

NOTES:-

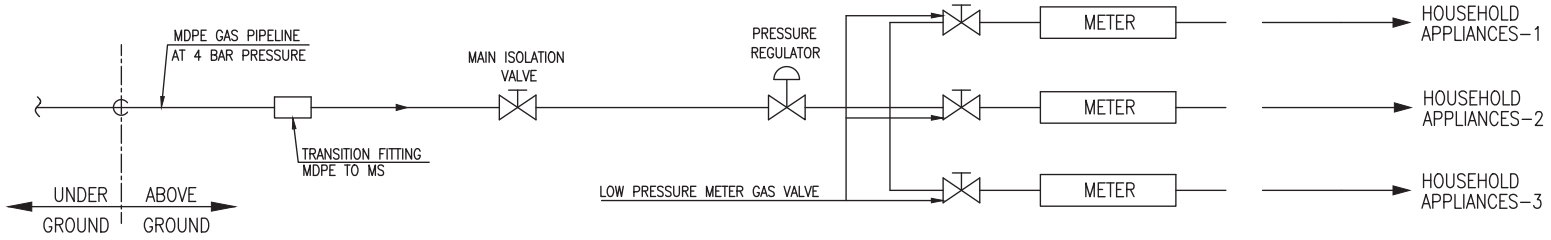
1. ALL DIMENSIONS ARE IN MM. UNLESS NOTED OTHERWISE.
2. SIZE OF LINE, VALVE ETC. SHALL BE DECIDED AT THE TIME OF EXECUTION AS PER THE INSTRUCTIONS OF OWNER/OWNER'S REPRESENTATIVE.



SCHEME OF NATURAL GAS SUPPLY TO SMALL COMMERCIAL CONSUMERS



SCHEME OF NATURAL GAS SUPPLY TO LARGE COMMERCIAL CONSUMERS



SCHEME OF NATURAL GAS SUPPLY TO DOMESTIC CONSUMERS

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CNG & CITY GAS DISTRIBUTION PROJECT

SCHEME OF GAS SUPPLY TO SMALL/LARGE/DOMESTIC CONSUMERS

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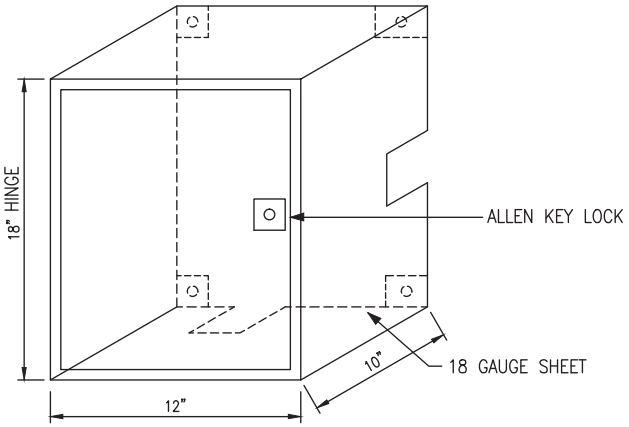
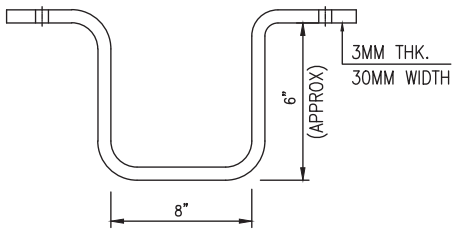
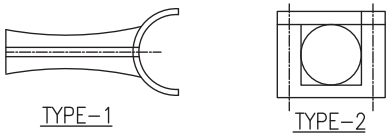


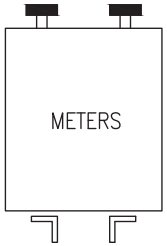
REGULATOR BOX



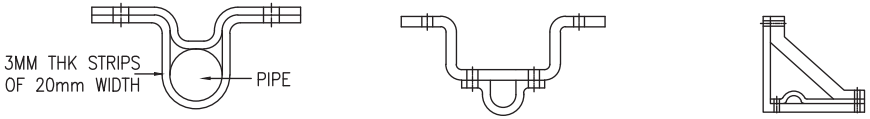
BRACKET FOR METERS
(DOMESTIC)



PE/PVC CLAMPS FOR COPPER PIPE



ANGLE BRACKETS 50x50mm
FOR NON DOMESTIC METERS



MS CLAMPS FOR GI PIPE

NOTES:–

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. CLAMP, REGULATOR BOX AND METER BRACKET ARE TO BE MADE AS PER DIRECTION AND APPROVAL OF EIC.
3. CLAMPS/BOXES BRACKETS TO BE TIGHTLY SECURED TO THE WALL WITH PROPER ROWEL PLUGS, SCREWS ETC. WOODEN BLOCK TO BE USED IN CASE ROWEL PLUGS DO NOT HOLD. PROPER THE AREA.
4. PAINTING WITH ONE COAT OF ZINC PRIMER AND THREE COATS OF SYNTHETIC ENAMEL PAINT OF REPUTED MAKE (ASIAN PAINT, BERGER, NEROLAC) TO BE USED.
5. CLAMPS ON PIPES TO BE FIXED AT MAXIMUM DISTANCE OF 1.5 mtrs AND AT BENDS.

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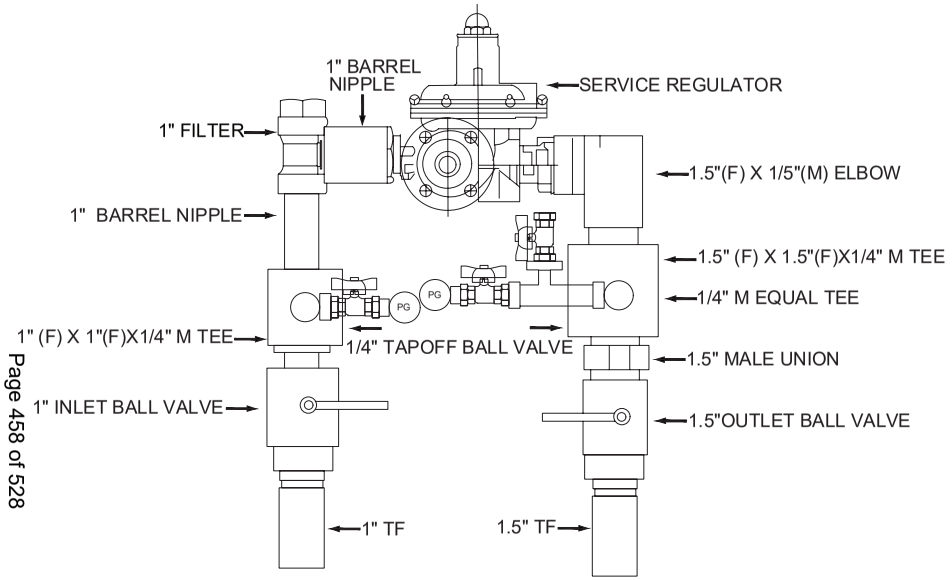
BRIDGE AND ROOF CO. (INDIA) LTD.

CNG & CITY GAS DISTRIBUTION PROJECT

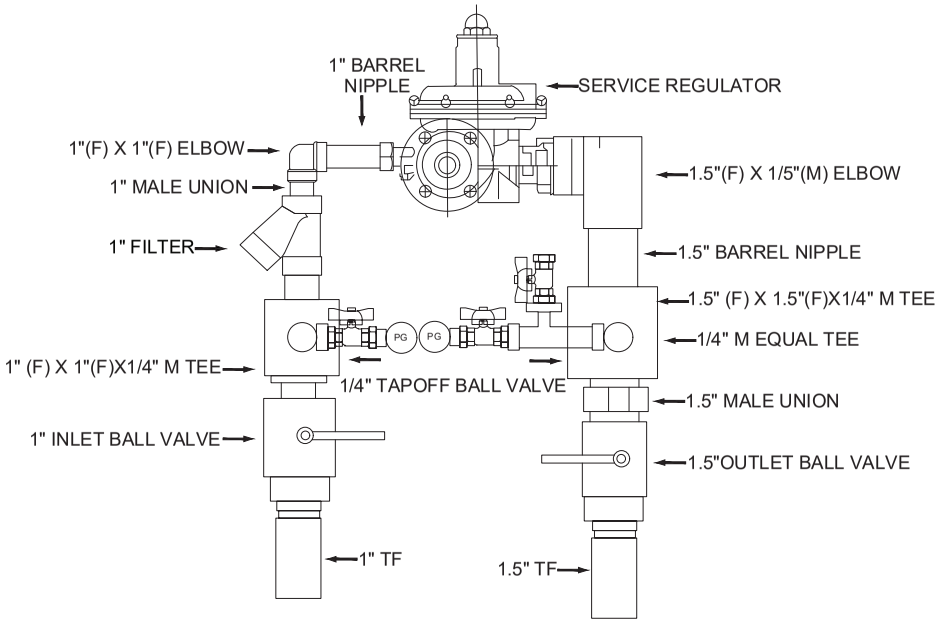
SKETCH FOR REGULATOR BOX, BRACKETS & CLAMPS

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-07



ARRANGEMENT 1: ANGLE TYPE FILTER



ARRANGEMENT 2: "Y" TYPE FILTER

GAIL_Internal

FOR TENDER PURPOSE ONLY.
SIZES OF PIPELINE AND FITTING ARE INDICATIVE ONLY. VENDOR SHOULD SPECIFY THE SIZES TO BE APPROVED BY CLIENT/ CONSULTANT.
FITTING WITH STANDARD DIMENSIONS SHALL BE USED.

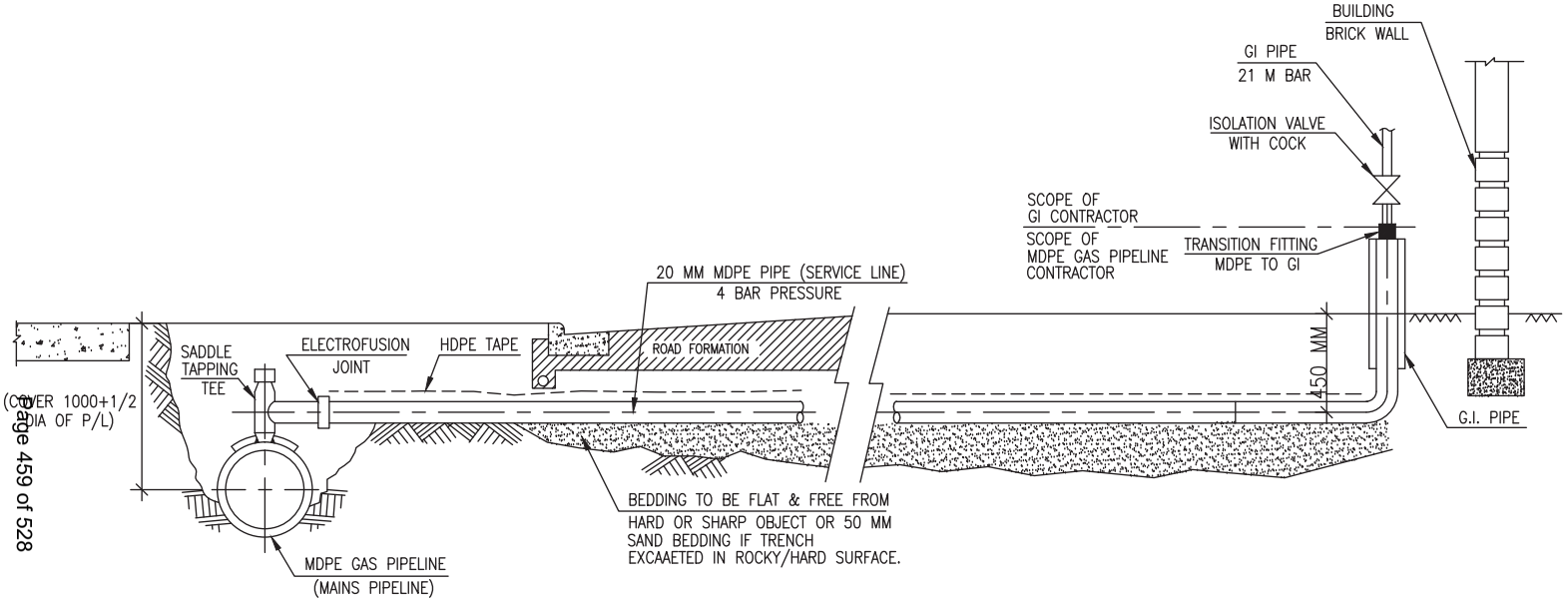
BRIDGE AND ROOF CO. (INDIA) LTD.

	DATE	NAME
DRAWN	27.02.26	V.V
CHECK	27.02.26	M.H
APPR.	27.02.26	S.T

CLIENT : M/S GAIL (INDIA)

DRAWING TITLE: SERVICE REGULATOR MODULE ARRANGEMENT DRAWING

SCALE	DRAWING NO.	SHEET	REV
NTS	GAIL/BANDR/GA/SRM/001	01 OF 01	0



GENERAL NOTES

1. FOR CLAMPING TO BRICK WALL USE SUITABLE WALL BRACKETS.
2. TRENCH BACK FILL TO BE FREE FROM STONES OR SHARP OBJECTS. CARE TO BE EXERCISED WHEN CONSOLIDATING BACK FILL TO AVOID DAMAGING PLASTIC PIPE.
3. THIS SKETCH IS INDICATIVE AND FINAL LAYING WILL BE DECIDED BY ENGINEER–IN–CHARGE.

FOR TENDER PURPOSE ONLY

GAIL_Internal

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BRIDGE AND ROOF CO. (INDIA) LTD.

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△	

REV. NO.	DATE	ZONE	DESCRIPTION / REVISION	BY	VERIFIED

REFERENCES — DRG. NO.

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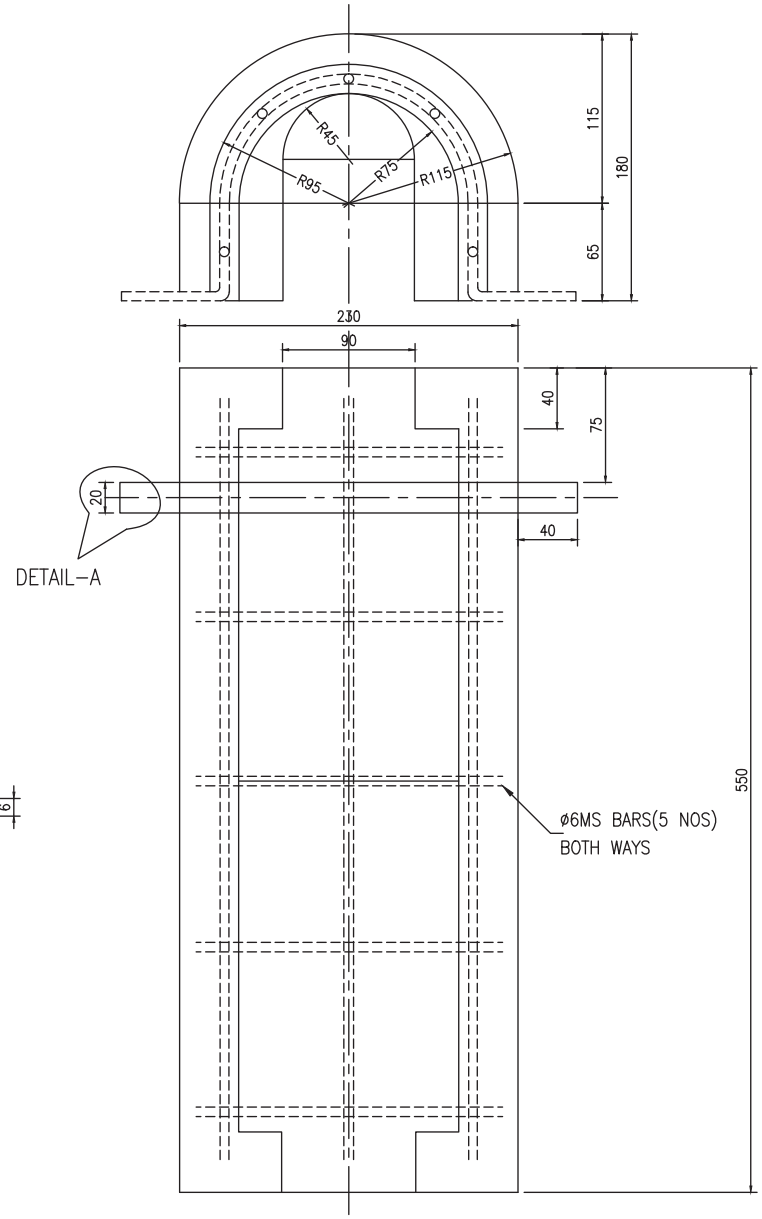
SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T / 16.05.2024

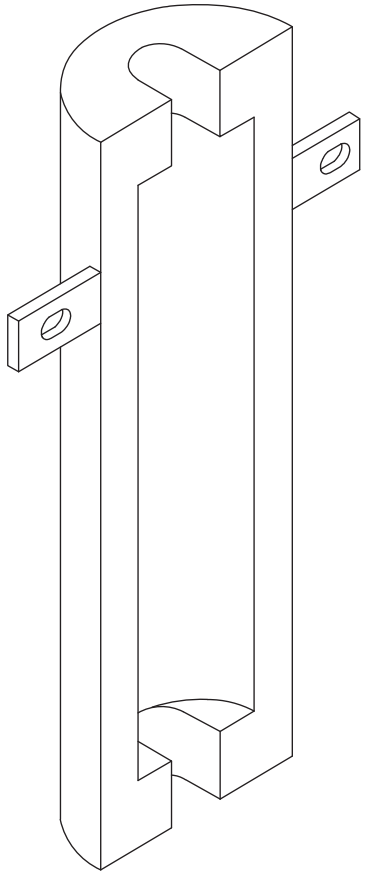
CNG & CITY GAS DISTRIBUTION PROJECT

SCHEME OF HIGH PRESSURE SERVICE INSTALLATION

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.:- BR-CGD-STD-DWG-08





ISOMETRIC VIEW

NOTES:–

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. IT SHALL BE TAKEN APPROVAL FROM OWNER/OWNER'S REPRESENTATIVE. BEFORE STARTING THE PROCUREMENT.
3. SIZES ARE SHOWN AS A TENTATIVE ONLY.

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			REVISION		

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	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

HALF ROUND CONCRETE SLEEVE

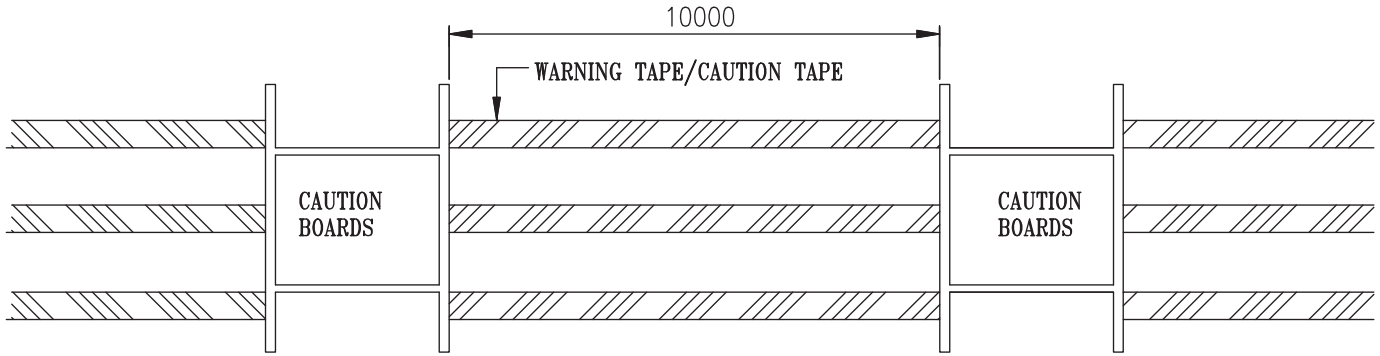
SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-09

GAIL Internal

NOTES:-

1. ALL DIMENSIONS ARE IN MM. UNLESS NOTED OTHERWISE.
2. TO THE CAUTION BOARDS REFER DRAWING NO. MEC/TYP/05/28/STD/1002



SCHEMATIC LAYOUT OF CAUTION BOARDS AND BARRICADDING

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REV. NO.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISION		

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SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
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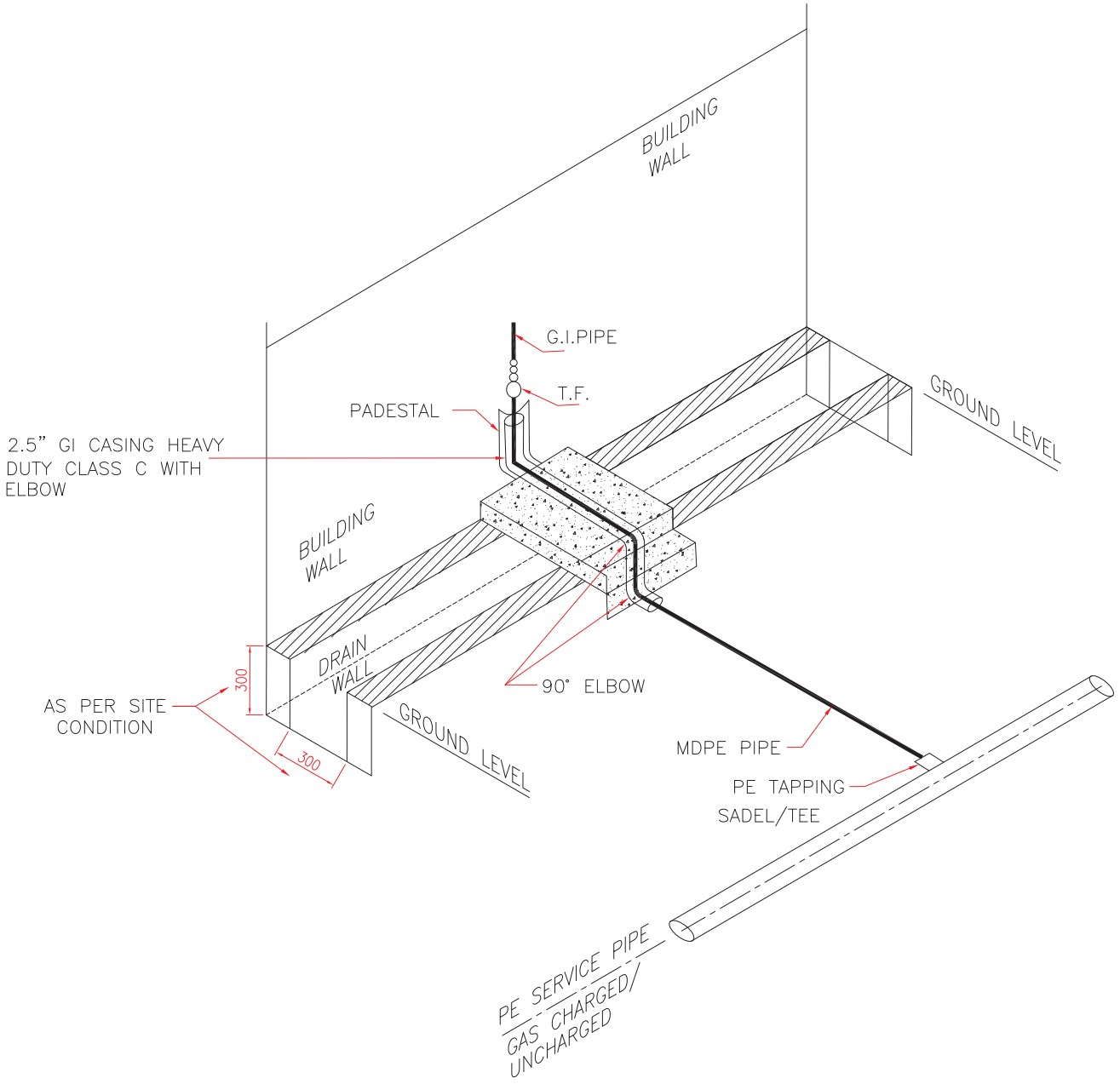
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

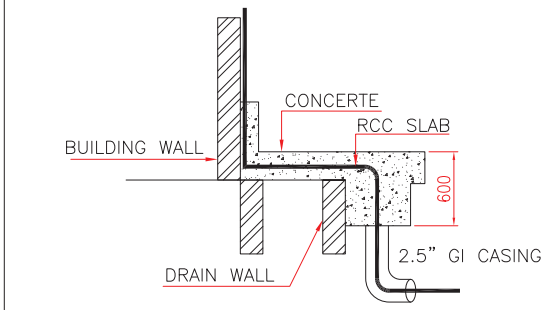
CNG & CITY GAS DISTRIBUTION PROJECT

BARRICADING

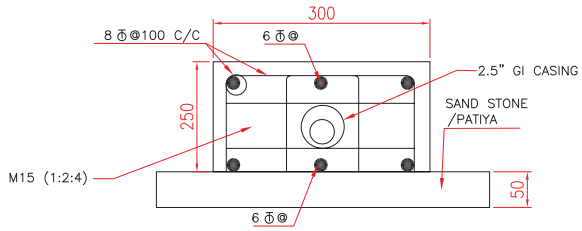
SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-10





SIDE VIEW SCHEME



TYPICAL SECTION OF COVER SLAB

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REV.NO	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISION		

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GAIL (India) Limited

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BRIDGE AND ROOF CO. (INDIA) LTD.

SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	29.05.2024

CITY GAS DISTRIBUTION NETWORK BHARATPUR

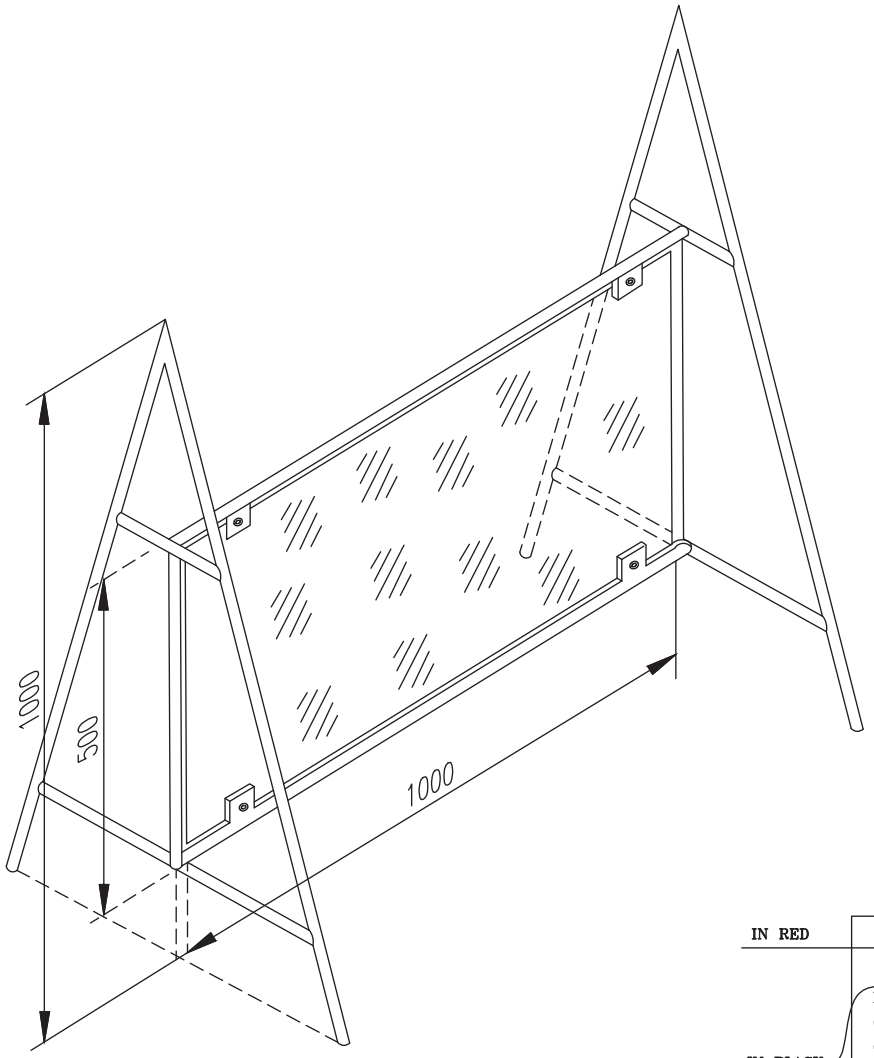
TYPICAL DRAWING FOR CROSSING OF DRAIN BY GI PIPE

SCALE – 1:150 | REV

DRG. NO.- BR-CGD-STD-DWG-33 | 0

NOTES:-

1. ALL DIMENSIONS ARE IN MM. UNLESS NOTED OTHERWISE.



IN RED → C A U T I O N ← CLIENT'S LOGO

WORK IN PROGRESS

IN BLACK

LAYING OF NATURAL GAS PIPELINE
CLIENT : OWNER'S NAME
CONTRACTOR NAME :
DATE OF COMMENCEMENT :
DATE OF COMPLETION :
EMERGENCY PHONE NOS:

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			REVISION		

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DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

CAUTION BOARD

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.:- BR-CGD-STD-DWG-11

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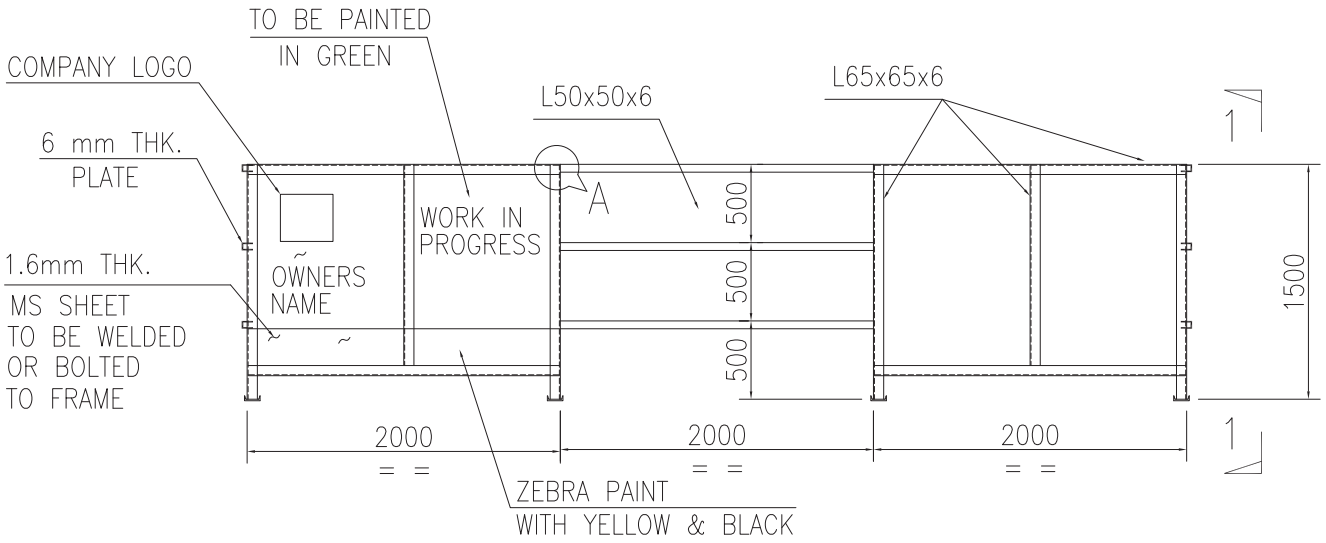
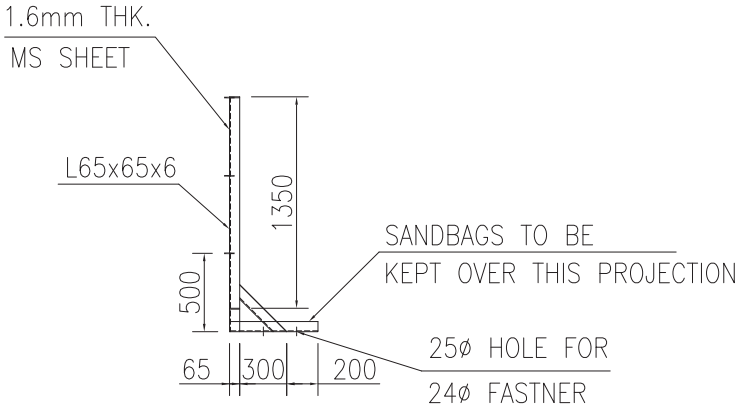
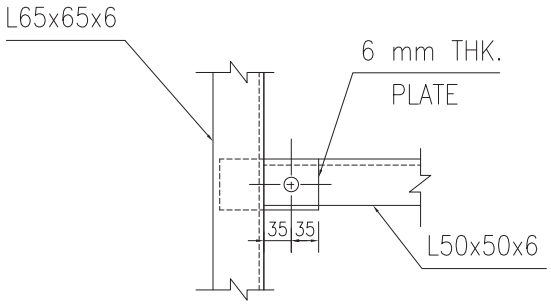


LAYOUT PLAN OF BARRICADE



SECTION 1-1



DETAIL-A

FOR TENDER PURPOSE

NOTES:-
1. ALL DIMENSIONS ARE IN mm

REV	INST.
SEC	CONCURRED BY

REV.NO	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISION		

REFERENCES | DRG.NO.

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BRIDGE AND ROOF CO.(I) LTD.

SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.K/A.M
DRAWN	S.A.A
CHECKED AND VERIFIED	SANDIP TALUKDAR
APPROVED	SANDIP TALUKDAR
DATE	25.06.2024

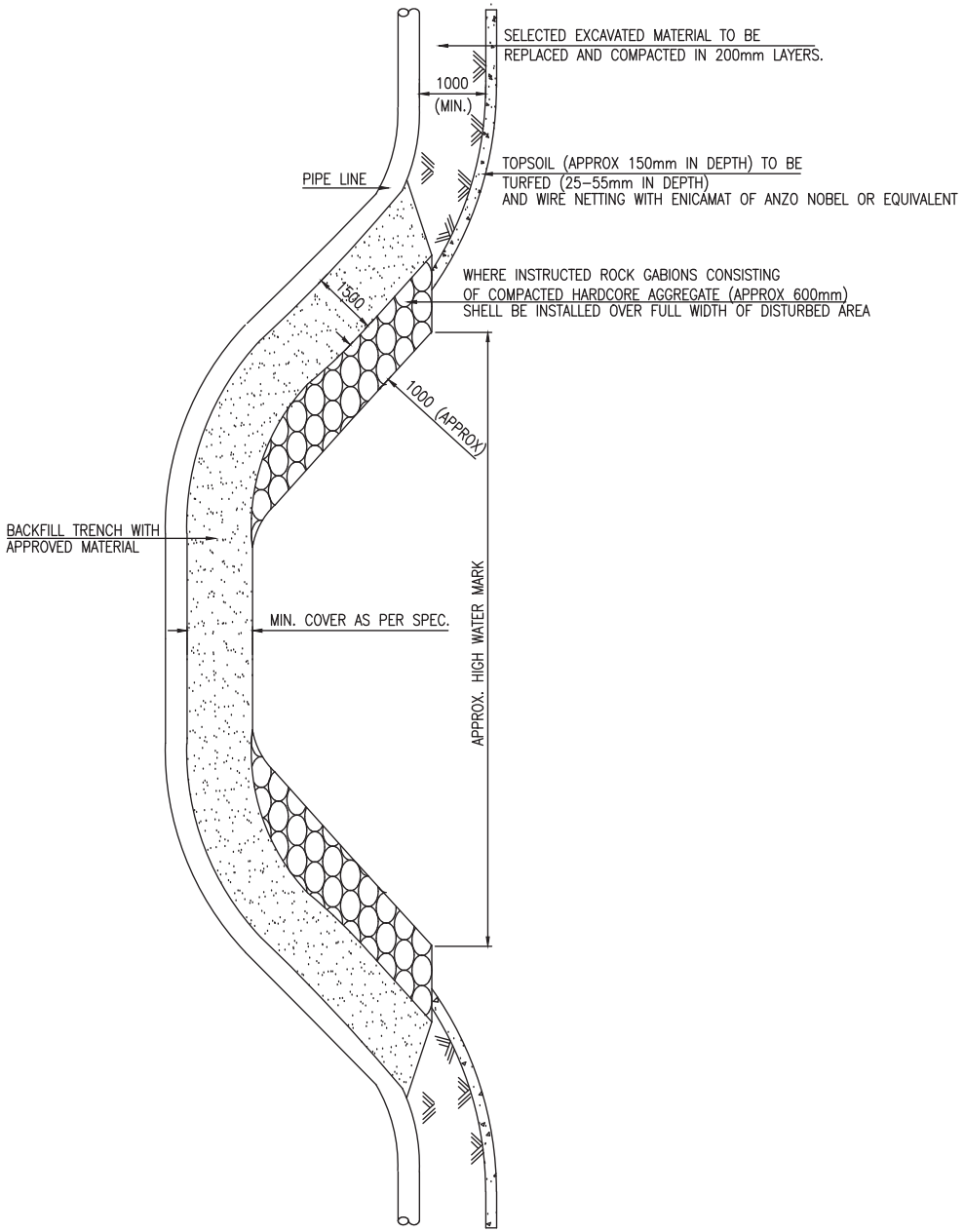
CNG & CITY GAS DISTRIBUTION PROJECT

BARRICADING

SCALE : NTS | SHEET 1 OF 1 | REV

DWG NO. - BR-CGD-STD.-DWG-36 | 0

GAIL_Internal



NOTES:–

1. BACKFILLING OF THE DISTURBED BANK AREA SHALL BE FINISHED A MINIMUM OF 100mm ABOVE THE ADJACENT UNDISTURBED BANK LEVELS.
2. BACKFILLING SHALL BE FINISHED FLUSH WITH INVERT AND BANK SLOPES EXCEPT THE REINSTATED SLOPE WHICH SHALL NOT EXCEED 40° IN WHICH CASE THE SLOPE SHALL BE EQUAL TO ADJACENT UNDISTURBED BANKS.
3. MIN. COVER 1.5M BELOW SCAMING DEPTH.

FOR TENDER PURPOSE ONLY

GAIL Internal

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REV. NO.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISION		

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DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

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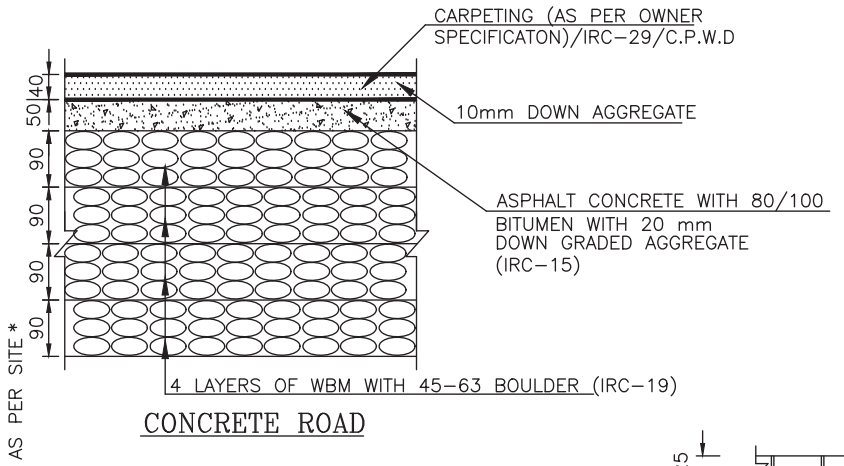
BRIDGE AND ROOF CO. (INDIA) LTD.

CNG & CITY GAS DISTRIBUTION PROJECT

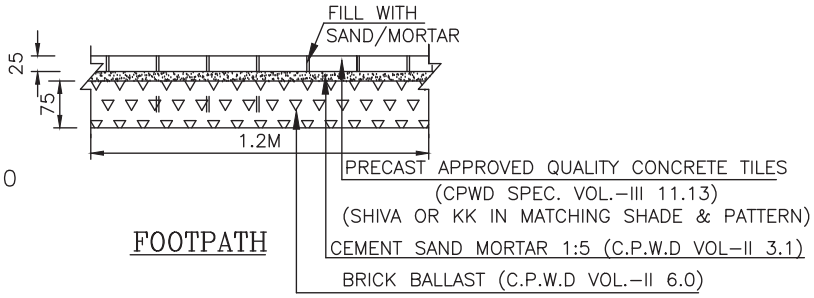
STD. DETAIL OF BACKFILL, FOR DRAIN CROSSING

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

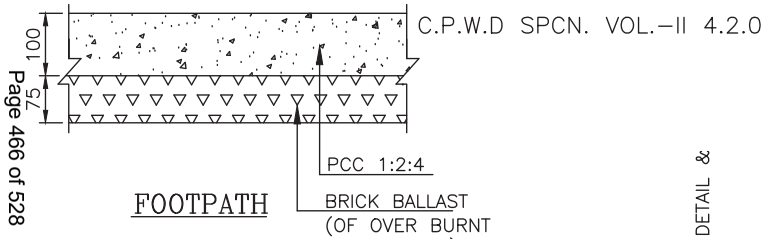
DRG. NO.- BR-CGD-STD-DWG-12



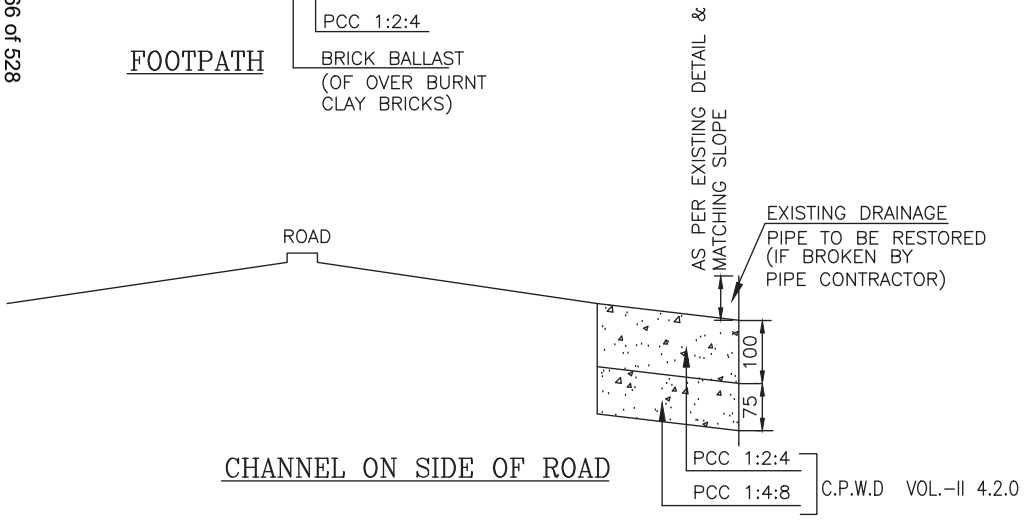
CONCRETE ROAD



FOOTPATH



FOOTPATH



CHANNEL ON SIDE OF ROAD

NOTES:-

1. ALL DIMENSIONS ARE IN mm & LEVELS ARE IN METRE.
2. ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED.
3. THESE ARE INDICATIVE SCHEME ONLY. ACTUAL WORK TO FOLLOW AS PER CPWD/PWD CONCERNED AUTHORITIES REQUIREMENTS IN RESPECTIVE AREA.

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BRIDGE AND ROOF CO. (INDIA) LTD.

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REV. NO.	DATE	ZONE	DESCRIPTION / REVISION	BY	VERIFIED

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APPROVED	S.T
	16.05.2024

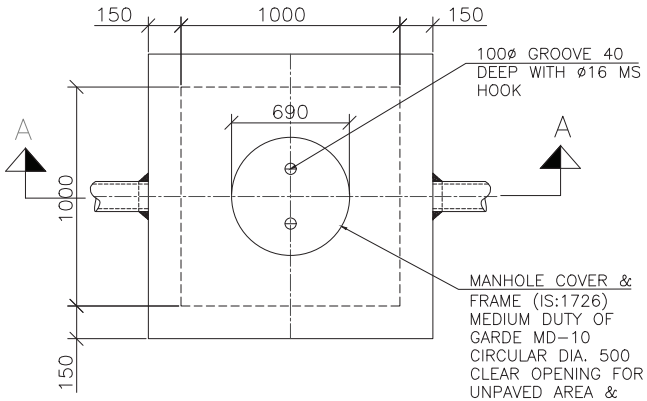
CNG & CITY GAS DISTRIBUTION PROJECT

RESTORATION OF ROADS, FOOTPATH & CHANNEL

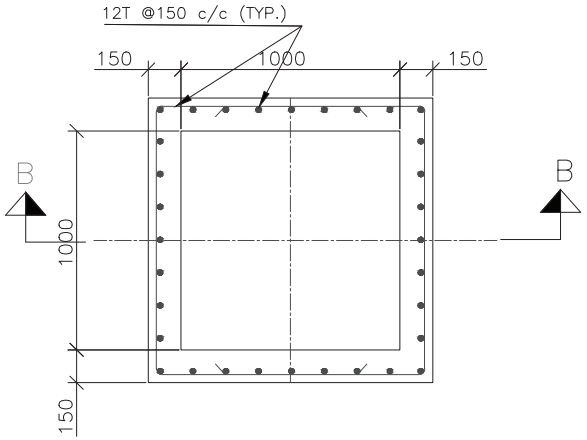
SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-13

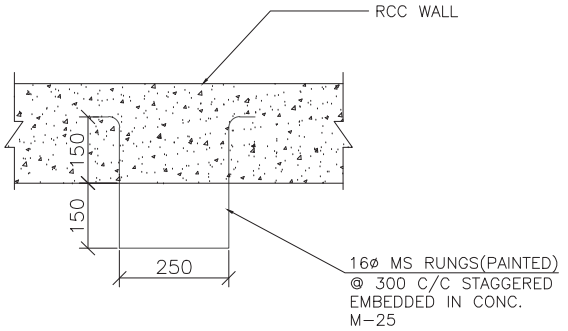
GAIL Internal



PLAN OF VALVE PIT



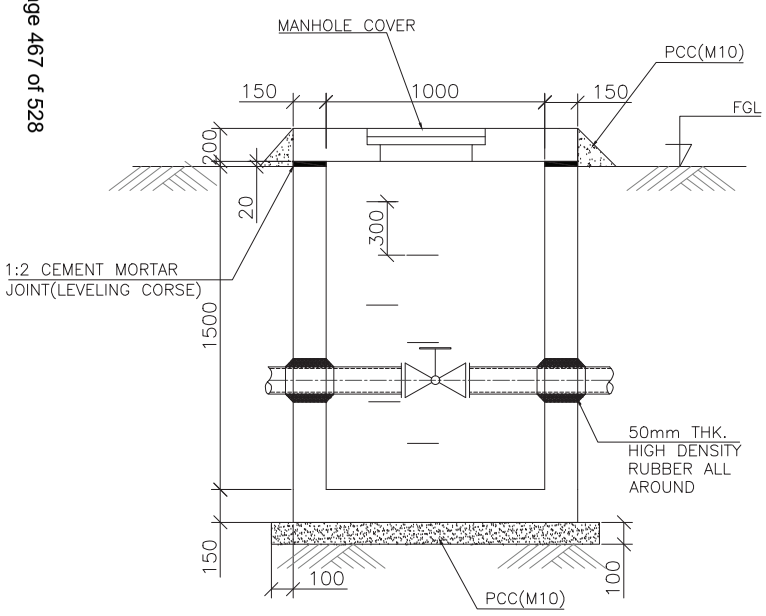
REINF. DETAILS OF VALVE PIT



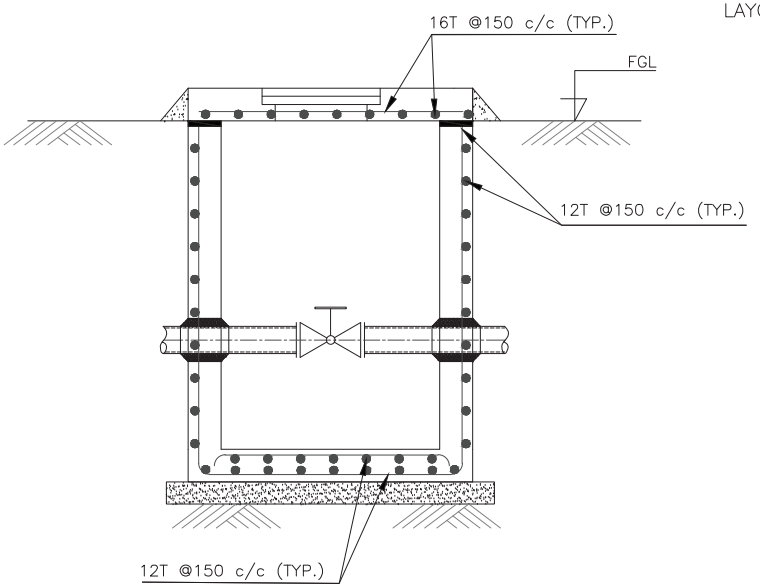
TYPICAL DETAIL OF MS RUNGS

NOTES:-

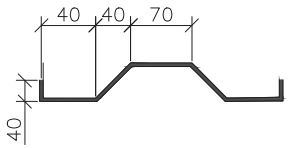
1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
2. ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONCRETE SHALL BE R.C.C M-25 & P.C.C M-10 UNLESS NOTED OTHERWISE.
4. ALL REINFORCEMENT STEEL SHALL BE HYSD OF GRADE Fe415 AND CONFIRMING TO IS1786.
5. ALL LOOSE SOIL BELOW THE FOUNDATION RAFT SHALL BE WELL COMPACTED BEFORE PCC/RCC WORK.
6. CLEAR COVER TO MAIN R/F SHALL BE 40mm.
7. FOR EXACT LOCATION & ORIENTATION OF VALVE PIT REFER LAYOUT DRAWING.



SECTION- A-A



SECTION- B-B



DETAIL OF 16Ø MS LIFTING HOOK

0	ISSUED FOR CONSTRUCTION	SK	12/03/26	AB	12/03/26	ST	12/03/26	SCALE	JOB NO.	DRAWING NO.	SHT / REV
REV	DESCRIPTION	BY	ON	BY	ON	BY	ON	N.T.S	71150	BR-CGD-STD.-DWG-133	- / 0
		DRAWN		CHECKED		APPROVED					

OWNER : GAIL INDIA LIMITED

CONSULTANT : BRIDGE AND ROOF CO. (INDIA) LTD.
A GOVERNMENT OF INDIA ENTERPRISE.
427/1, GRAND TRUNK ROAD, HOWRAH-711101

PROJECT : CITY GAS DISTRIBUTION NETWORK IN SIX GA

TITLE : DETAIL OF RCC VALVE PIT (TYPE-I) (SIZE- 1000x1000)

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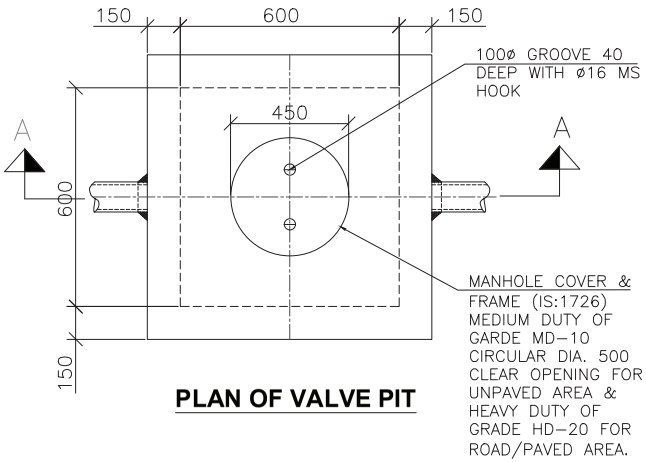
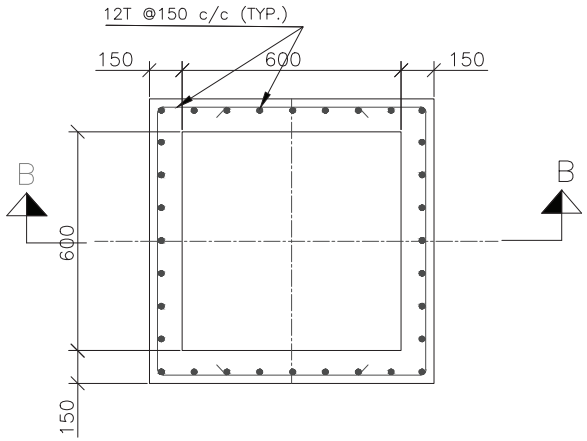
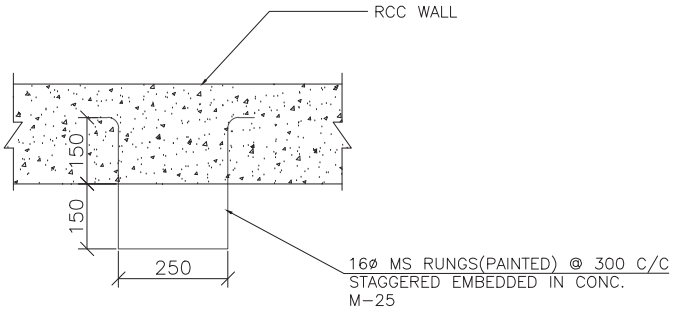


PLAN OF VALVE PIT



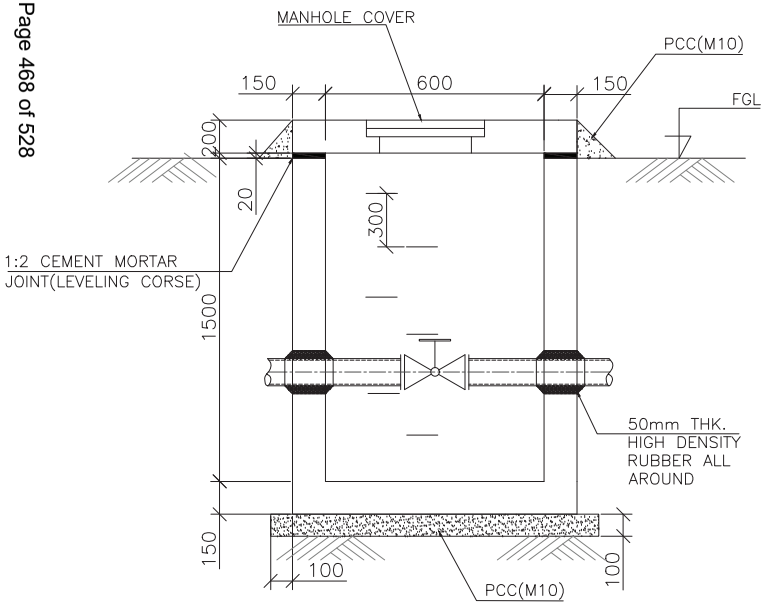
REINF. DETAILS OF VALVE PIT



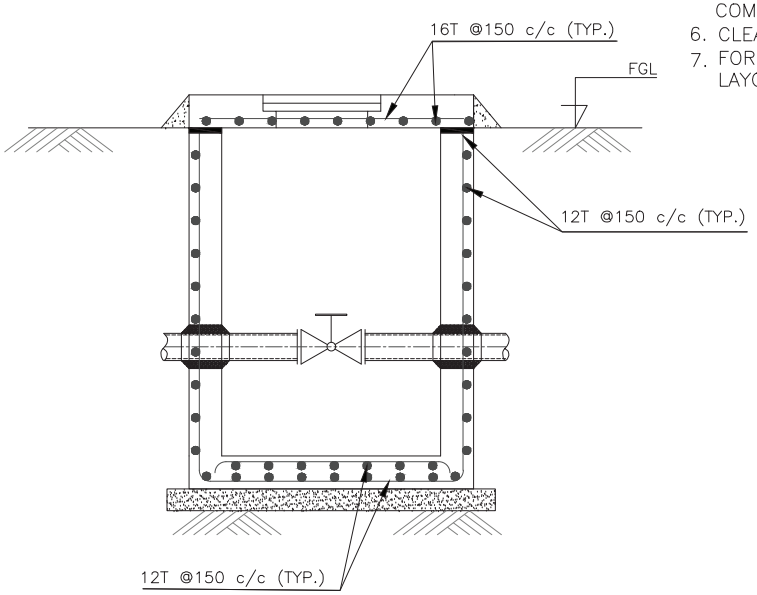
TYPICAL DETAIL OF MS RUNGS

NOTES:-

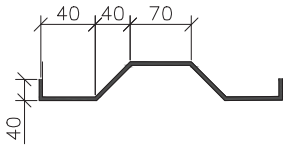
1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
2. ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONCRETE SHALL BE R.C.C M-25 & P.C.C M-10 UNLESS NOTED OTHERWISE.
4. ALL REINFORCEMENT STEEL SHALL BE HYSD OF GRADE Fe415 AND CONFIRMING TO IS1786.
5. ALL LOOSE SOIL BELOW THE FOUNDATION RAFT SHALL BE WELL COMPACTED BEFORE PCC/RCC WORK.
6. CLEAR COVER TO MAIN R/F SHALL BE 40mm.
7. FOR EXACT LOCATION & ORIENTATION OF VALVE PIT REFER LAYOUT DRAWING.



SECTION- A-A



SECTION- B-B



DETAIL OF 16Ø MS LIFTING HOOK

0	ISSUED FOR CONSTRUCTION	SK	12/03/26	AB	12/03/26	ST	12/03/26	SCALE	JOB NO.	DRAWING NO.	SHT / REV
REV	DESCRIPTION	BY	ON	BY	ON	BY	ON	N.T.S	71150	BR-CGD-STD.-DWG-134	- / 0
		DRAWN		CHECKED		APPROVED					

OWNER : GAIL INDIA LIMITED

CONSULTANT : BRIDGE AND ROOF CO. (INDIA) LTD.
A GOVERNMENT OF INDIA ENTERPRISE.
427/1, GRAND TRUNK ROAD, HOWRAH-711101

PROJECT : CITY GAS DISTRIBUTION NETWORK IN SIX GA

TITLE : DETAIL OF RCC VALVE PIT (TYPE-I) (SIZE- 600x600)

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GAIL_Internal

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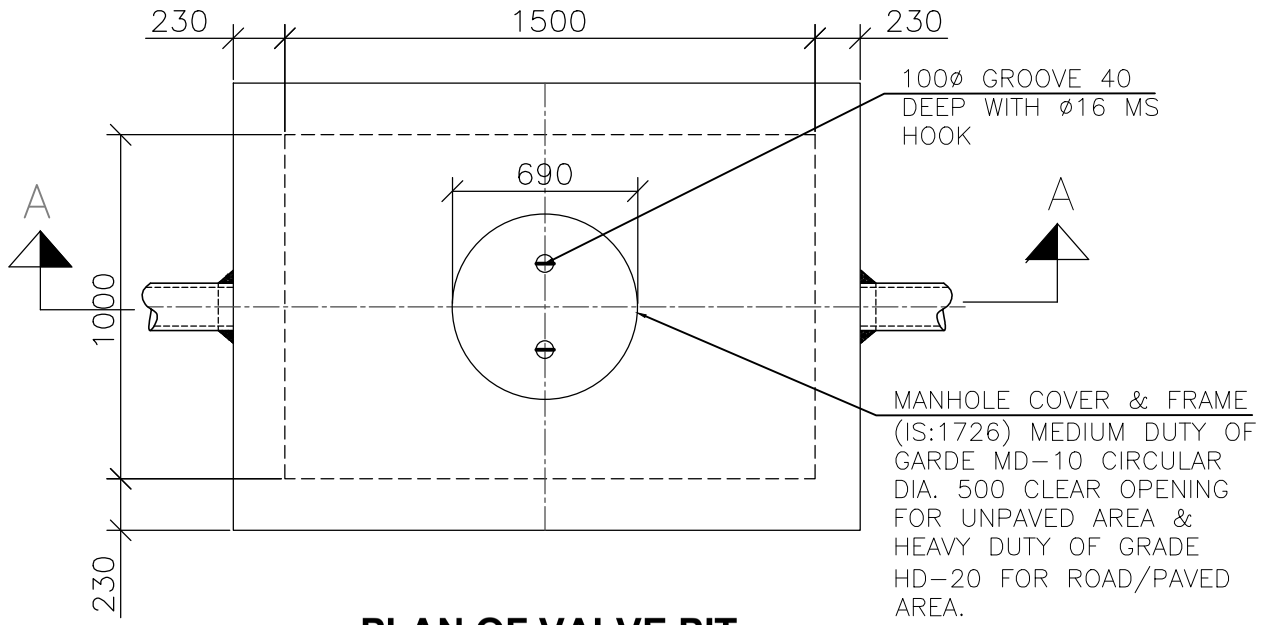
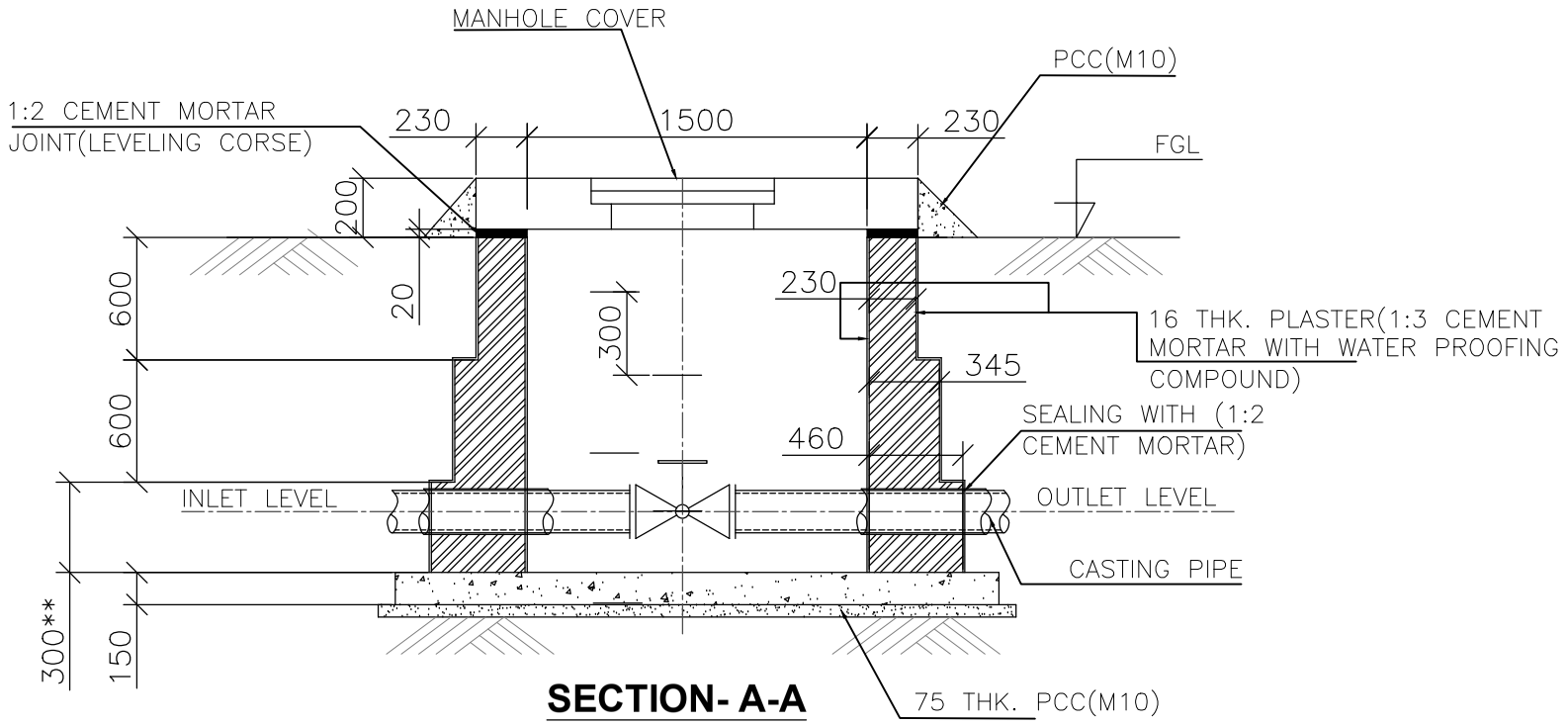
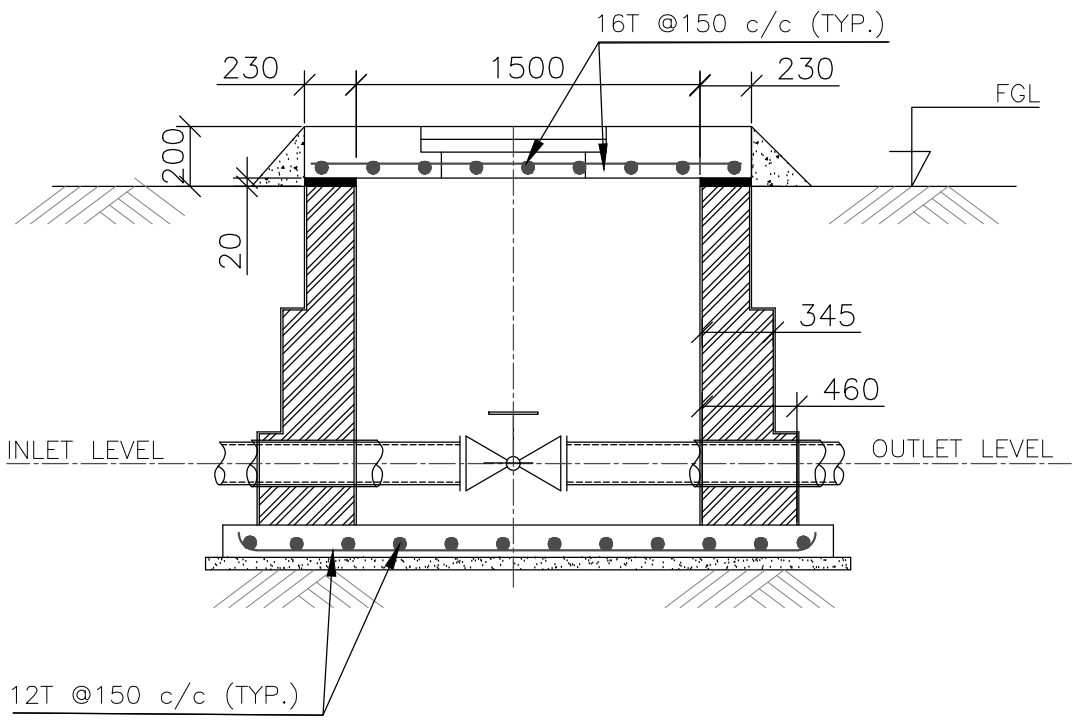


PLAN OF VALVE PIT

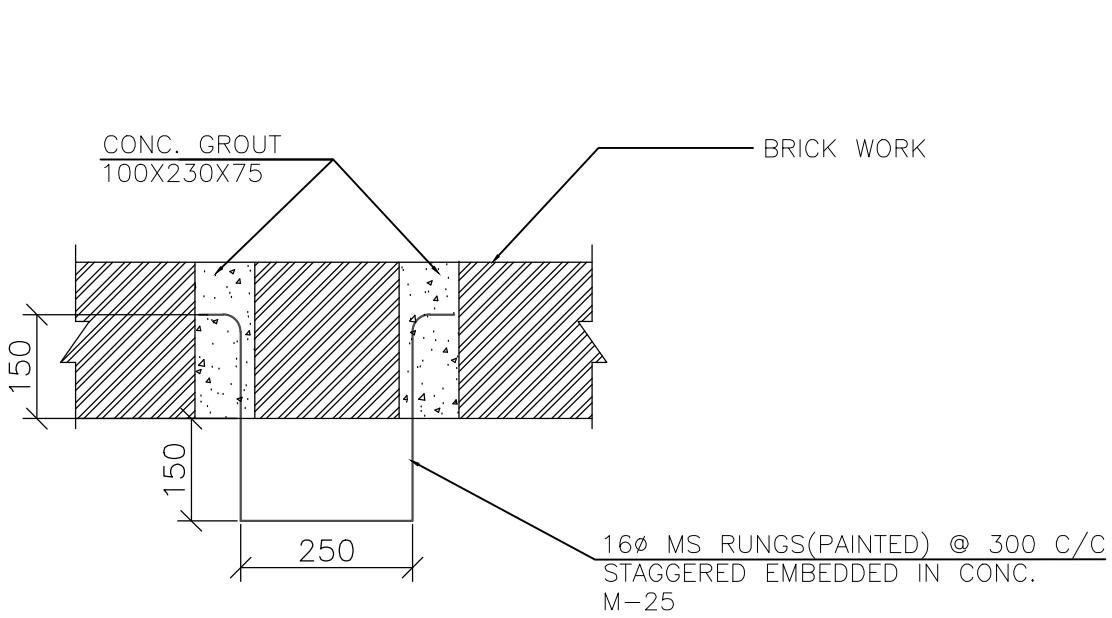


SECTION- A-A

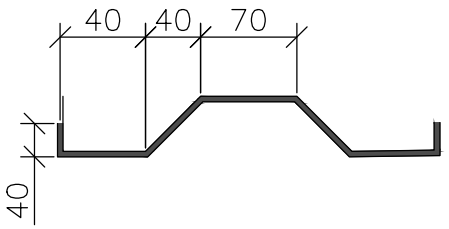
** THIS DEPTH CAN VARY AS PER SITE REQUIREMENT



R/F STEEL DETAILS



TYPICAL DETAIL OF MS RUNGS



DETAIL OF 16Ø MS LIFTING HOOK

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
2. ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONCRETE SHALL BE R.C.C M-25 & P.C.C M-10 UNLESS NOTED OTHERWISE.
4. ALL REINFORCEMENT STEEL SHALL BE HYSD OF GRADE Fe415 AND CONFIRMING TO IS1786.
5. ALL LOOSE SOIL BELOW THE FOUNDATION RAFT SHALL BE WELL COMPACTED BEFORE PCC/RCC WORK.
6. CLEAR COVER TO MAIN R/F SHALL BE 40mm.
7. FOR EXACT LOCATION & ORIENTATION OF VALVE PIT REFER LAYOUT DRAWING.

REV	DESCRIPTION						
0	ISSUED FOR CONSTRUCTION	SK	20 05/26	AB	20 05/26	ST	20 05/26
		BY	ON	BY	ON	BY	ON
		DRAWN		CHECKED		APPROVED	

OWNER : GAIL INDIA LIMITED

CONSULTANT: BRIDGE AND ROOF CO. (INDIA) LTD.
A GOVERNMENT OF INDIA ENTERPRISE.
427/1, GRAND TRUNK ROAD, HOWRAH-711101

PROJECT : CITY GAS DISTRIBUTION NETWORK IN SIX GA

TITLE : STANDARD DETAILS OF BRICK VALVE CHAMBER (SIZE- 1500x1000) (DEPTH ≥ 1.5M)

SCALE	JOB NO.	DRAWING NO.	SHT	REV
N.T.S	71150	BR-CGD-STD.-DWG-137	-	0

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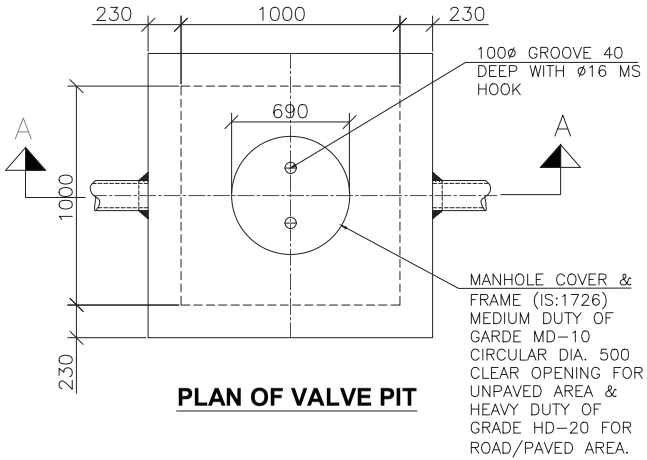
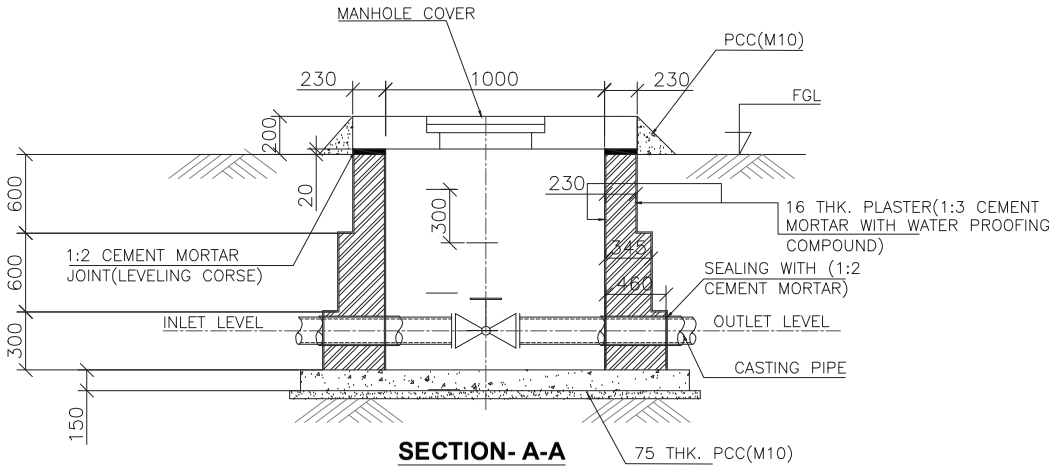
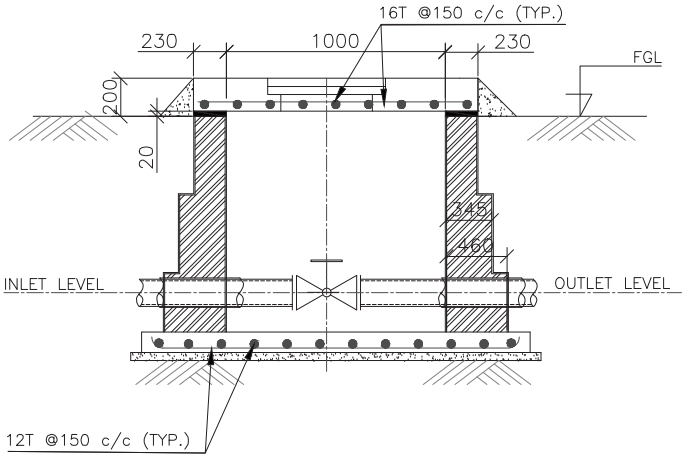


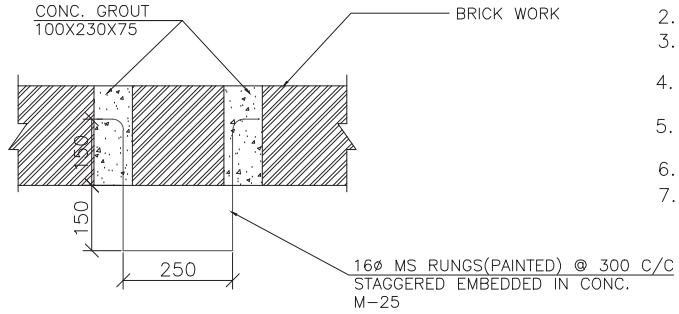
PLAN OF VALVE PIT



SECTION- A-A



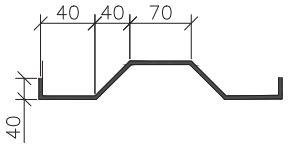
R/F STEEL DETAILS



TYPICAL DETAIL OF MS RUNGS

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
2. ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONCRETE SHALL BE R.C.C M-25 & P.C.C M-10 UNLESS NOTED OTHERWISE.
4. ALL REINFORCEMENT STEEL SHALL BE HYSD OF GRADE Fe415 AND CONFIRMING TO IS1786.
5. ALL LOOSE SOIL BELOW THE FOUNDATION RAFT SHALL BE WELL COMPACTED BEFORE PCC/RCC WORK.
6. CLEAR COVER TO MAIN R/F SHALL BE 40mm.
7. FOR EXACT LOCATION & ORIENTATION OF VALVE PIT REFER LAYOUT DRAWING.



DETAIL OF 16Ø MS LIFTING HOOK

0	ISSUED FOR CONSTRUCTION	SK	12/03/26	AB	12/03/26	ST	12/03/26		
REV	DESCRIPTION	BY	ON	BY	ON	BY	ON		
		DRAWN		CHECKED		APPROVED			

OWNER :	GAIL INDIA LIMITED				
CONSULTANT:	BRIDGE AND ROOF CO. (INDIA) LTD. A GOVERNMENT OF INDIA ENTERPRISE. 427/1, GRAND TRUNK ROAD, HOWRAH-711101				
PROJECT :	CITY GAS DISTRIBUTION NETWORK IN SIX GA				
TITLE :	STANDARD DETAILS OF BRICK VALVE CHAMBER (TYPE-I) (SIZE- 1000x1000)				
SCALE	JOB NO.	DRAWING NO.	SHT	REV	
N.T.S	71150	BR-CGD-STD.-DWG-135	-	0	

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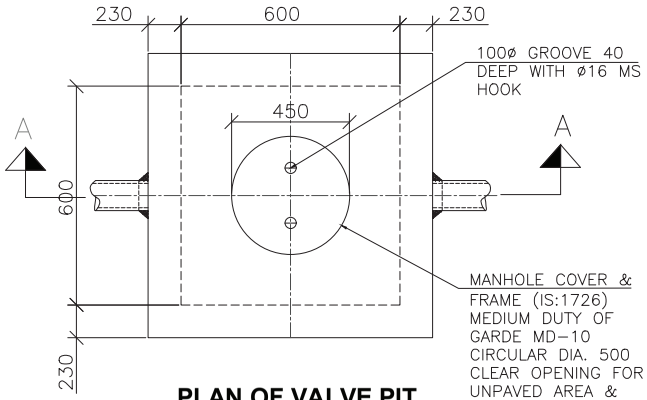
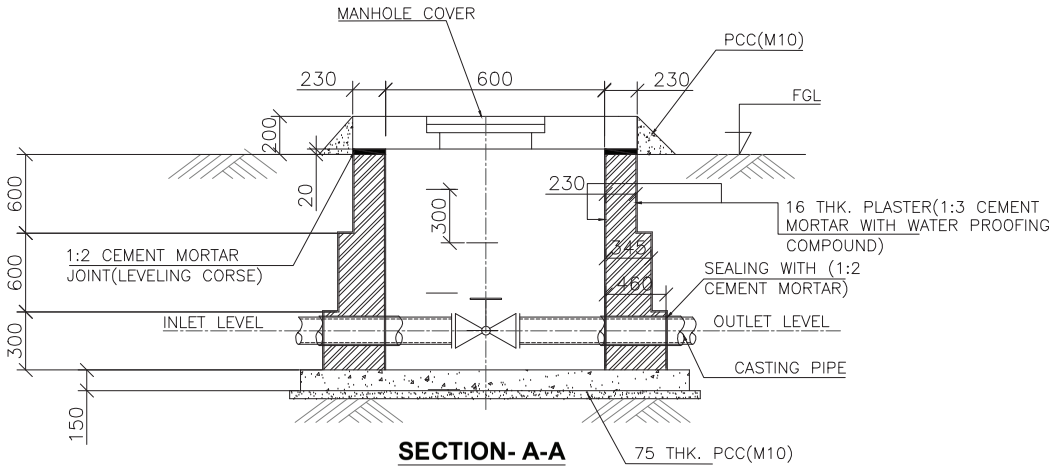
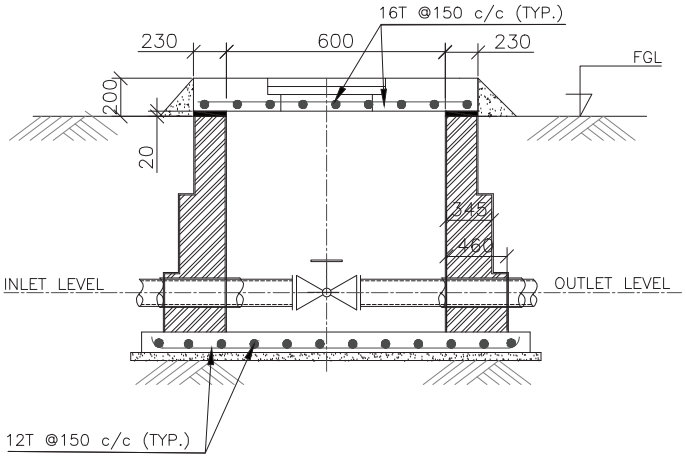
GAIL_Internal



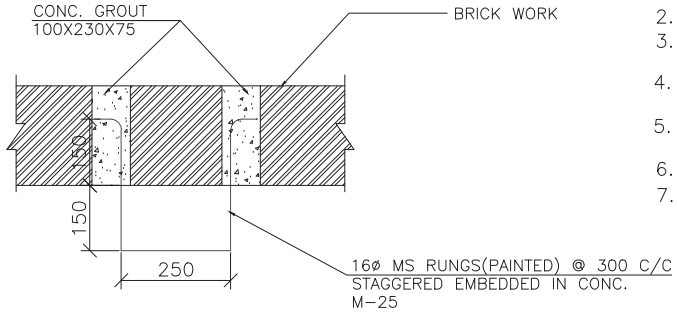
PLAN OF VALVE PIT



SECTION- A-A



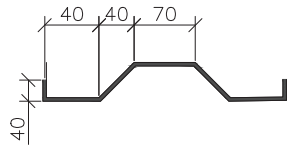
R/F STEEL DETAILS



TYPICAL DETAIL OF MS RUNGS

NOTES:–

1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
2. ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONCRETE SHALL BE R.C.C M–25 & P.C.C M–10 UNLESS NOTED OTHERWISE.
4. ALL REINFORCEMENT STEEL SHALL BE HYSD OF GRADE Fe415 AND CONFIRMING TO IS1786.
5. ALL LOOSE SOIL BELOW THE FOUNDATION RAFT SHALL BE WELL COMPACTED BEFORE PCC/RCC WORK.
6. CLEAR COVER TO MAIN R/F SHALL BE 40mm.
7. FOR EXACT LOCATION & ORIENTATION OF VALVE PIT REFER LAYOUT DRAWING.



DETAIL OF 16Ø MS LIFTING HOOK

GAIL_Internal

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OWNER : GAIL INDIA LIMITED

CONSULTANT: **BRIDGE AND ROOF CO. (INDIA) LTD.**
A GOVERNMENT OF INDIA ENTERPRISE.
427/1, GRAND TRUNK ROAD, HOWRAH–711101

PROJECT : CITY GAS DISTRIBUTION NETWORK IN SIX GA

TITLE : STANDARD DETAILS OF BRICK VALVE CHAMBER (TYPE-I) (SIZE- 600x600)

REV	DESCRIPTION	BY	ON	BY	ON	BY	ON
		DRAWN		CHECKED		APPROVED	
0	ISSUED FOR CONSTRUCTION	SK	12/03/26	AB	12/03/26	ST	12/03/26

SCALE	JOB NO.	DRAWING NO.	SHT	REV
N.T.S	71150	BR-CGD-STD.-DWG-136	-	0

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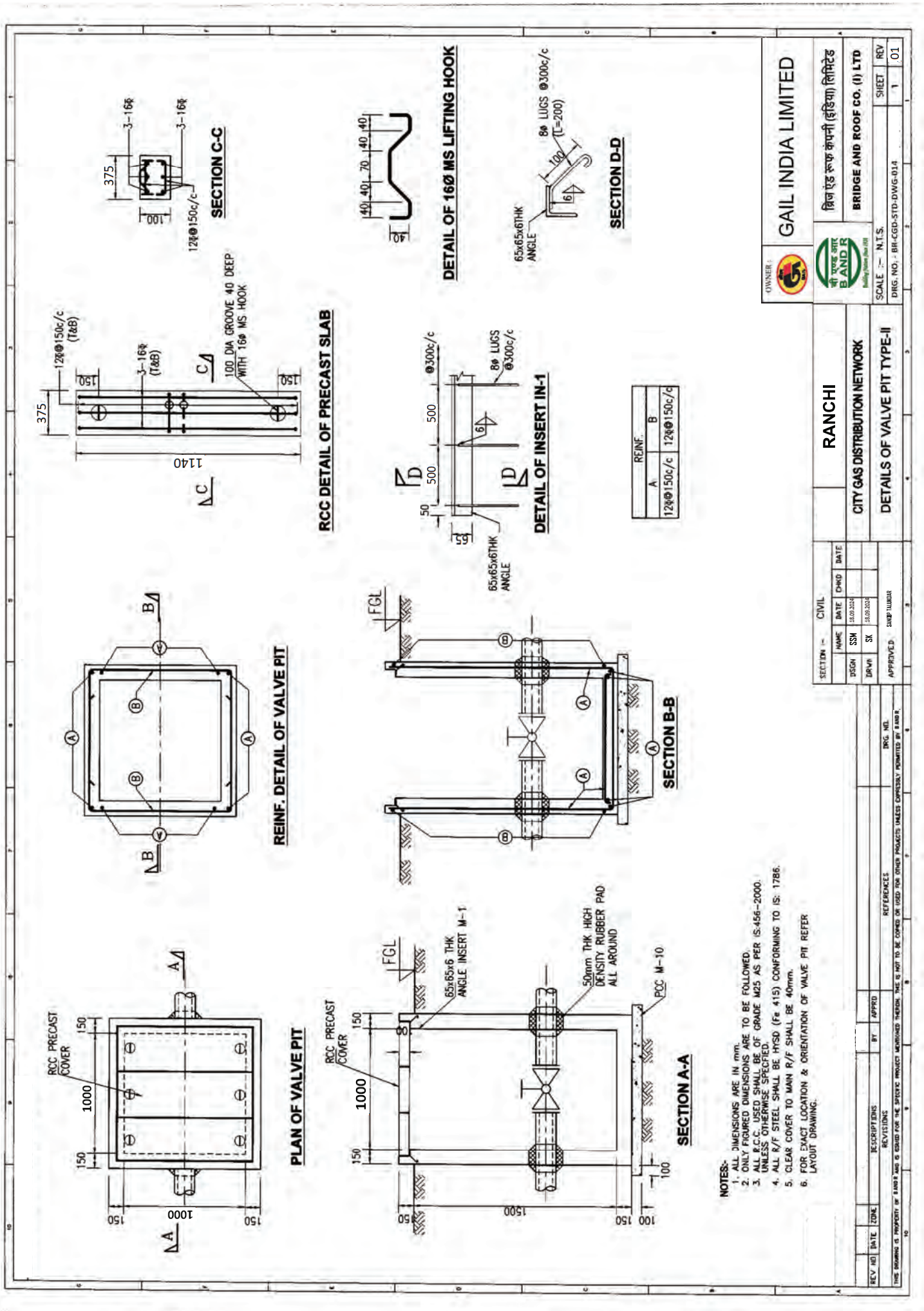
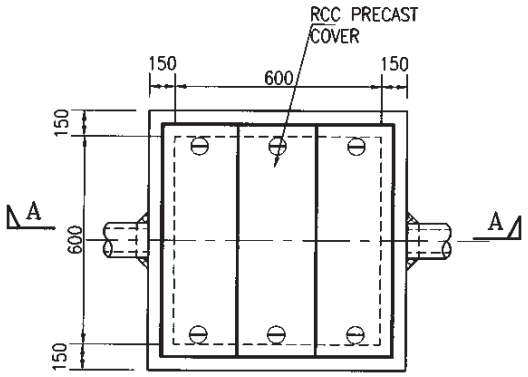
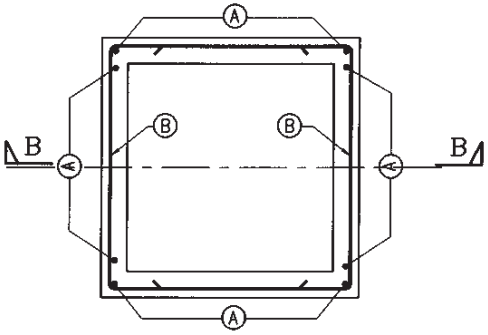
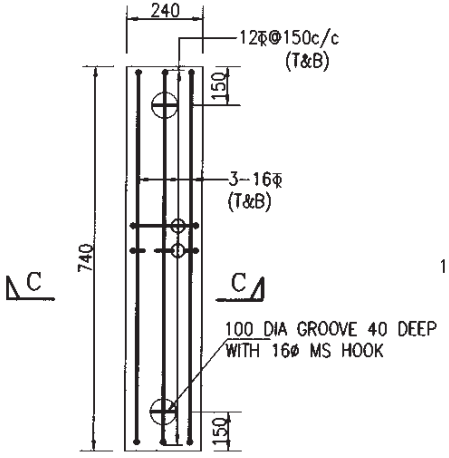

PLAN OF VALVE PIT
SECTION A-A
SECTION B-B
REINF. DETAIL OF VALVE PIT
RCC DETAIL OF PRECAST SLAB
SECTION C-C
DETAIL OF 16Ø MS LIFTING HOOK
SECTION D-D
DETAIL OF INSERT IN-1
RCC PRECAST COVER
65x65x6 THK ANGLE INSERT M-1
50mm THK HIGH DENSITY RUBBER PAD ALL AROUND
PCC M-10
FGL
100 DIA GROOVE 40 DEEP WITH 16Ø MS HOOK
8Ø LUGS @300c/c (T=200)
65x65x6THK ANGLE
REINF.
A
B
12Ø@150c/c
12Ø@150c/c
NOTES:-
1. ALL DIMENSIONS ARE IN mm.
2. ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED.
3. ALL R.C.C. USED SHALL BE OF GRADE M25 AS PER IS:456-2000. UNLESS OTHERWISE SPECIFIED.
4. ALL R/F STEEL SHALL BE HYSD (Fe 415) CONFORMING TO IS: 1786.
5. CLEAR COVER TO MAIN R/F SHALL BE 40mm.
6. FOR EXACT LOCATION & ORIENTATION OF VALVE PIT REFER LAYOUT DRAWING.
OWNER :
GAIL INDIA LIMITED
RANCHI
CITY GAS DISTRIBUTION NETWORK
BRIDGE AND ROOF CO. (I) LTD
DETAILS OF VALVE PIT TYPE-II
SCALE :– N.T.S.
DRG. NO. - BR-CGD-STD-DWG-014
SHEET 1
REV 01
SECTION :– CIVIL
DESIGN SSM 18.09.2024
DRAWN SK 18.09.2024
APPROVED SANJIV TALWAR
REV NO DATE ZONE DESCRIPTIONS BY APPRD
REVISIONS
REFERENCES
DRG. NO.



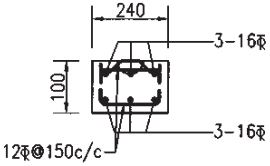
PLAN OF VALVE PIT



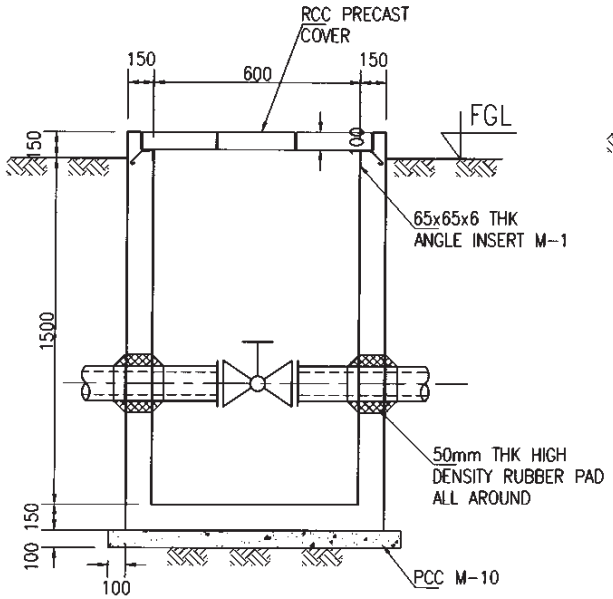
REINF. DETAIL OF VALVE PIT



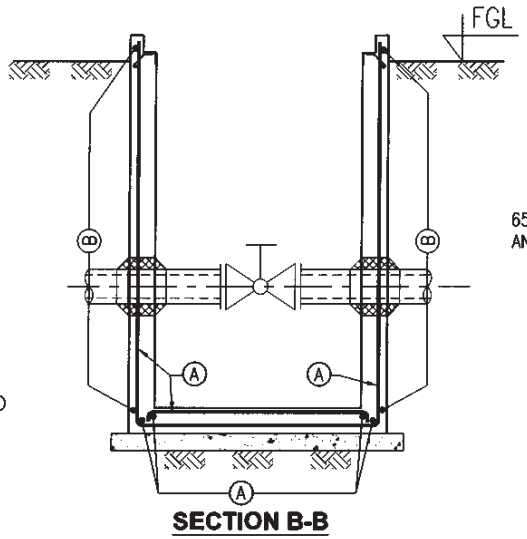
RCC DETAIL OF PRECAST SLAB



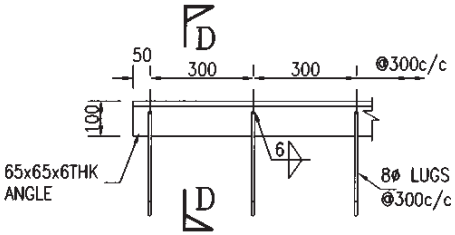
SECTION C-C



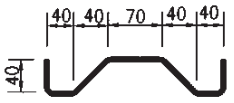
SECTION A-A



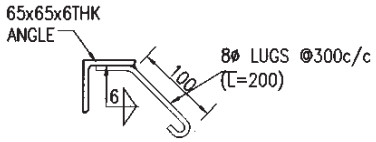
SECTION B-B



DETAIL OF INSERT IN-1



DETAIL OF 16Ø MS LIFTING HOOK



SECTION D-D

REINF.	
A	B
12ϕ@150c/c	12ϕ@150c/c

NOTES:-

1. ALL DIMENSIONS ARE IN mm.
2. ONLY FIGURED DIMENSIONS ARE TO BE FOLLOWED.
3. ALL R.C.C. USED SHALL BE OF GRADE M25 AS PER IS:456-2000. UNLESS OTHERWISE SPECFIED.
4. ALL R/F STEEL SHALL BE HYSD (Fe 415) CONFORMING TO IS: 1786.
5. CLEAR COVER TO MAIN R/F SHALL BE 40mm.
6. FOR EXACT LOCATION & ORIENTATION OF VALVE PIT REFER LAYOUT DRAWING.

CONCURRED BY

REV NO	DATE	ZONE	DESCRIPTIONS	BY	APPRD
REVISIONS			REFERENCES		DRG. NO.

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SECTION :- CIVIL				
	NAME	DATE	CHKD	DATE
DSGN	SSM	22.05.24		
DRWN	SK	22.05.24		
APPROVED	SANDIP TALUKDAR			

CITY GAS DISTRIBUTION NETWORK

DETAILS OF VALVE PIT TYPE-II

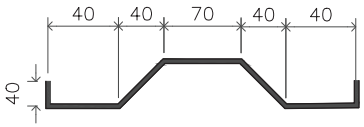
बी एण्ड आर B AND R

ब्रिज एंड रूफ कंपनी (इंडिया) लिमिटेड

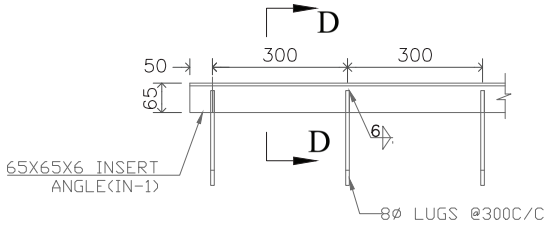
BRIDGE AND ROOF CO. (I) LTD

SCALE :- N.T.S.	SHEET	REV
DRG. NO. - BR-CGD-STD-DWG-015	1	0

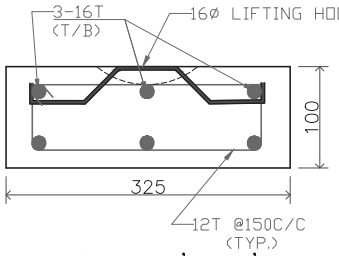
GAIL_Internal



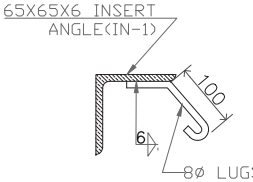
DETAIL OF 16ø MS LIFTING HOOK



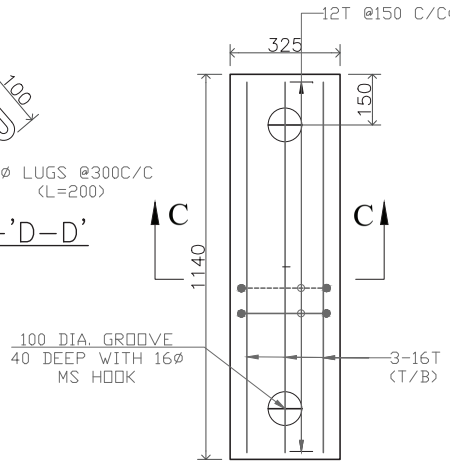
DETAIL OF INSERT IN-1



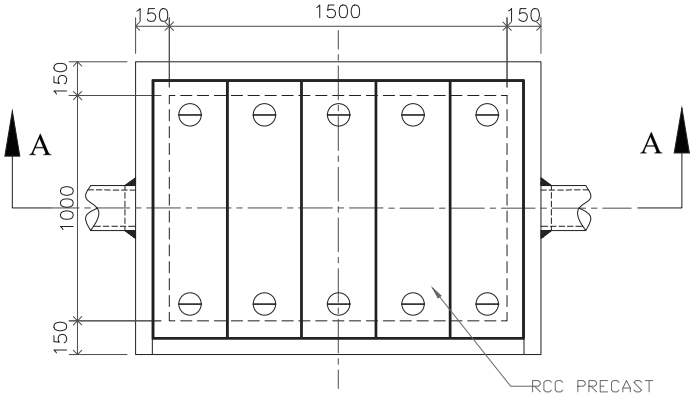
SECTION-'C-C'



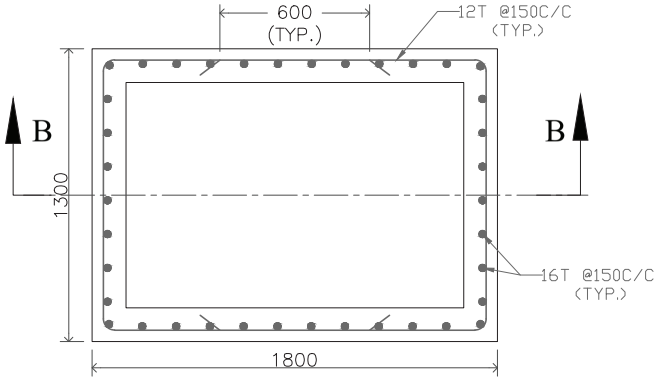
SECTION-'D-D'



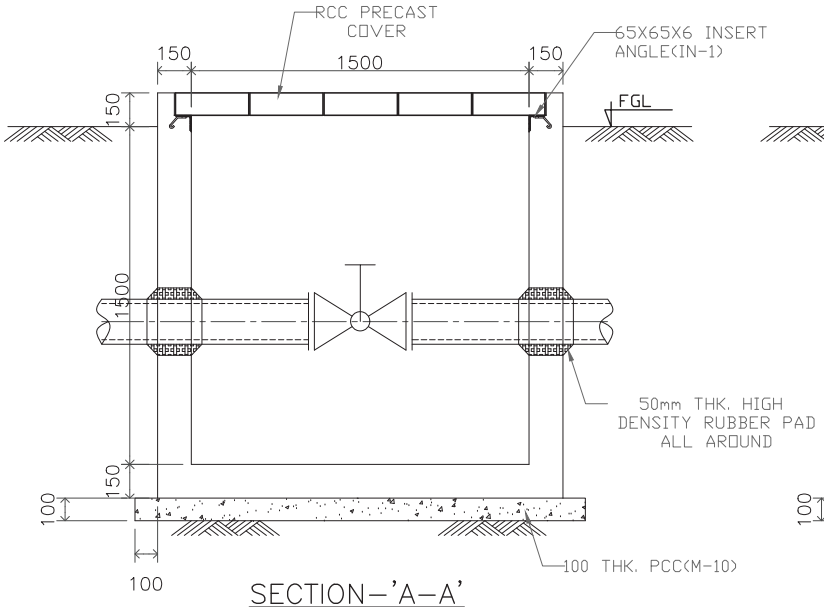
RCC DETAIL OF PRECAST SLAB



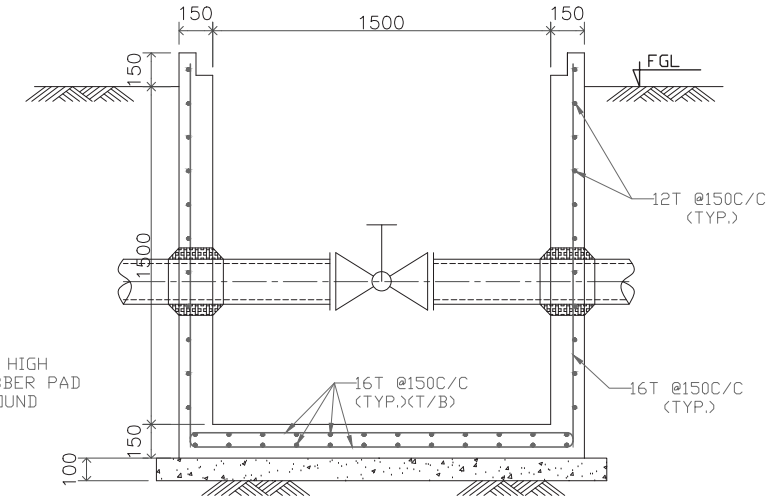
PLAN OF VALVE PIT



R/F DETAILS OF VALVE PIT



SECTION-'A-A'



SECTION-'B-B'

LEGEND :-

B/W - BOTHWAYS
TYP. - TYPICAL
NTS - NOT TO SCALE

NOTES :-

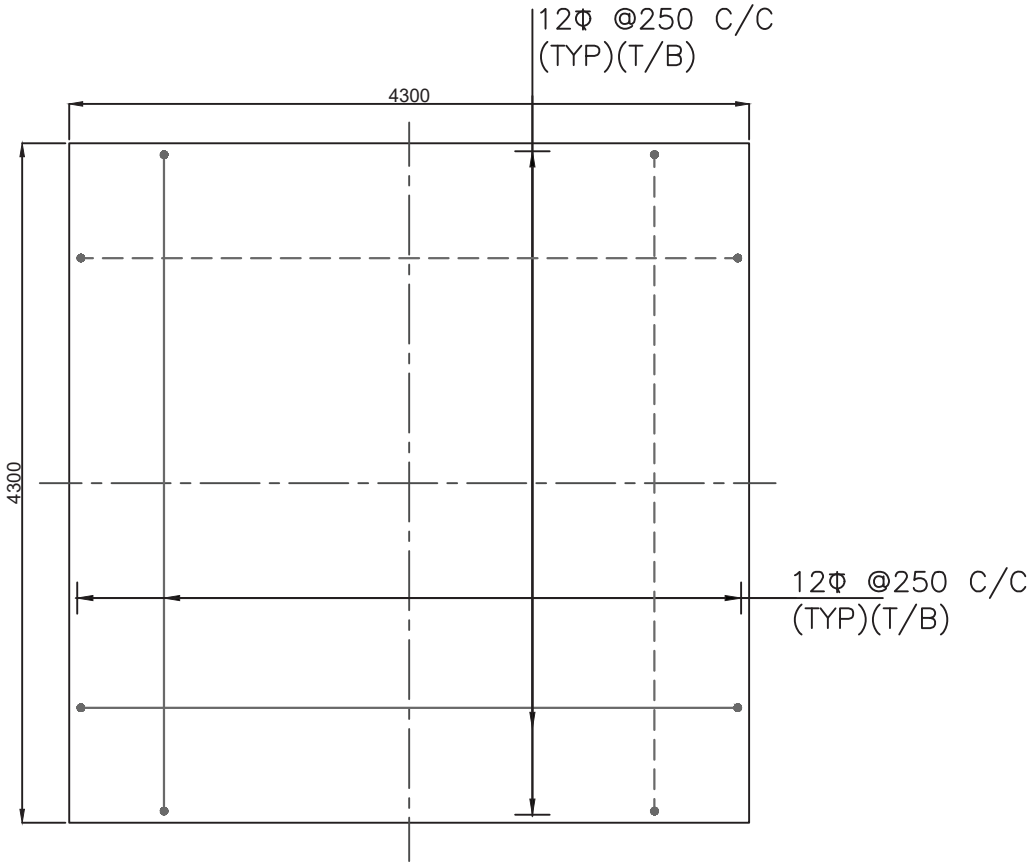
1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
2. ± 0.00 CORRESPOND TO TOP OF FORECOURT LEVEL
3. GRADE OF CONCRETE SHALL BE R.C.C M-25 & P.C.C M-10 UNLESS NOTED OTHERWISE.
4. ALL REINF. STEEL SHALL BE HYSD OF GRADE Fe500D AND CONFIRMING TO IS1786.
5. ALL LOOSE SOIL BELOW THE FOUNDATION RAFT SHALL BE WELL COMPACTED BEFORE PCC/RCC WORK.
6. CLEAR COVER TO MAIN R/F SHALL BE 45mm IN PEDESTAL/COLUMN AND 50mm IN BOTTOM SLAB.
7. DEVELOPMENT LENGTH SHALL BE 50 TIMES DIA. OF BAR.
10. FOR EXACT LOCATION & ORIENTATION OF VALVE PIT REFER LAYOUT DRAWING.

OWNER :	GAIL INDIA LIMITED
CONSULTANT:	**BRIDGE AND ROOF CO. (INDIA) LTD.** A GOVERNMENT OF INDIA ENTERPRISE. 427/1, GRAND TRUNK ROAD, HOWRAH-711101
PROJECT :	CITY GAS DISTRIBUTION NETWORK IN SIX GA
TITLE :	TYPICAL DETAILS OF VALVE PIT TYPE-III

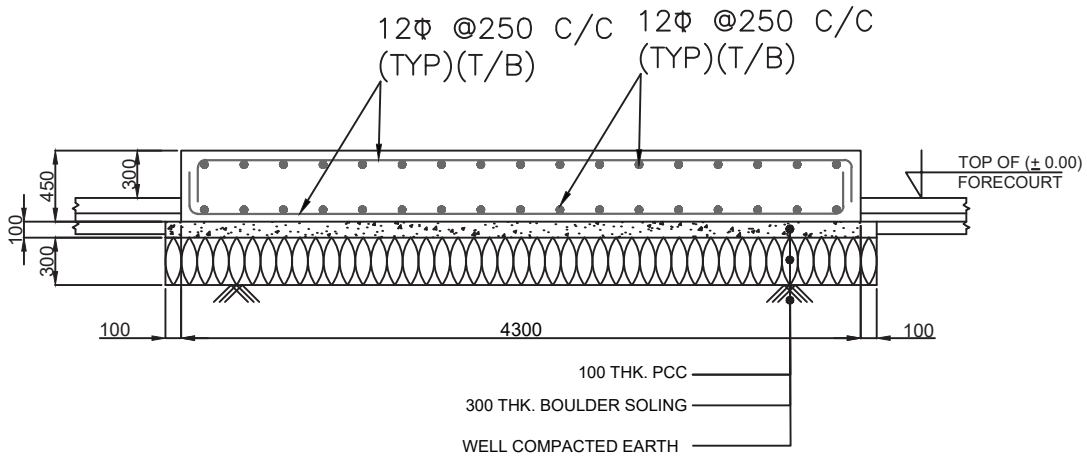
REV	DESCRIPTION	S.K 09/12/24 BY	A.M 09/12/24 BY	S.T 09/12/24 BY	SCALE	JOB NO.	DRAWING NO.	SHT	REV
0	ISSUED FOR CONSTRUCTION	ON	ON	ON	N.T.S	71150	BR-CGD-STD.-DWG-106	-	0
		DRAWN	CHECKED	APPROVED					

GAIL_Internal

GAIL_Internal



FOUNDATION PLAN



SECTION 1–1

LEGEND :–

B/W - BOTHWAYS
TYP. - TYPICAL
NTS - NOT TO SCALE

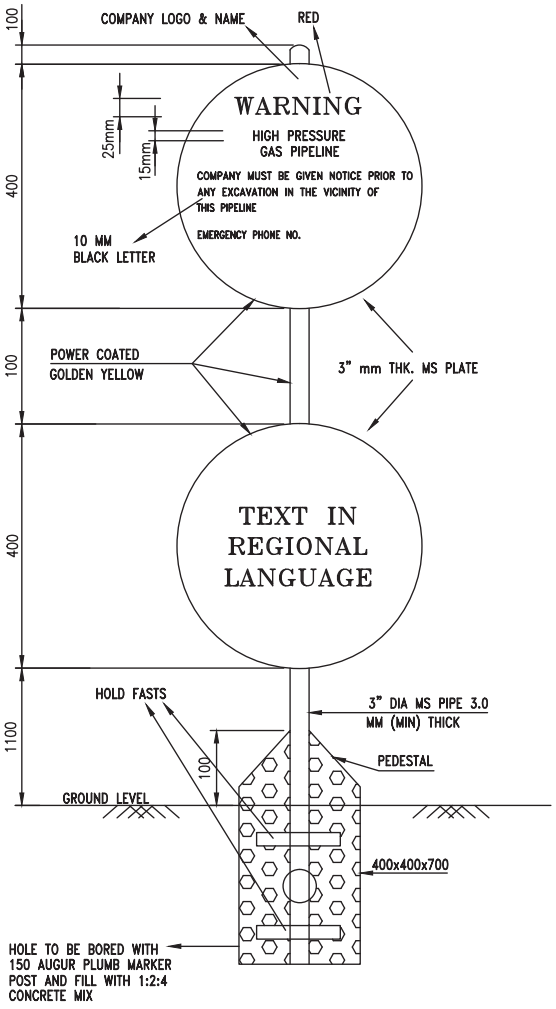
NOTES :–

1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED.
2. ± 0.00 CORRESPOND TO TOP OF FORECOURT LEVEL
3. GRADE OF CONCRETE SHALL BE R.C.C M–25 & P.C.C M–10 UNLESS NOTED OTHERWISE.
4. ALL REINF. STEEL SHALL BE HYSD OF GRADE Fe500D AND CONFIRMING TO IS1786.
5. ALL LOOSE SOIL BELOW THE FOUNDATION RAFT SHALL BE WELL COMPACTED BEFORE PCC/RCC WORK.
6. CLEAR COVER TO MAIN R/F SHALL BE 45mm IN PEDESTAL/COLUMN AND 50mm IN BOTTOM SLAB.
7. DEVELOPMENT LENGTH SHALL BE 50 TIMES DIA. OF BAR.
10. FOR EXACT LOCATION & ORIENTATION OF DRS/DCU REFER LAYOUT DRAWING.

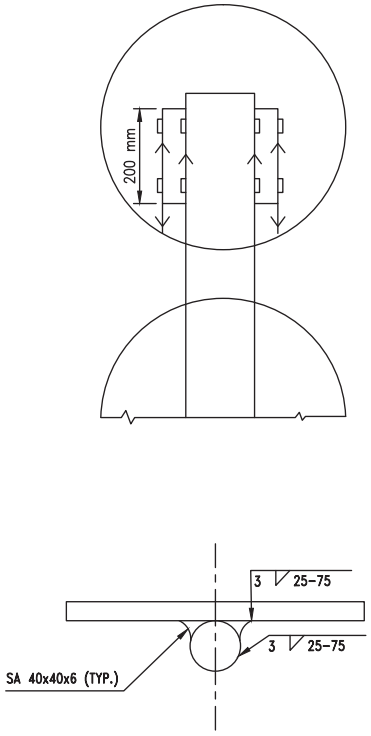
0	ISSUED FOR CONSTRUCTION	S.K	09/12/24	SKM	09/12/24	S.T	09/12/24
REV	DESCRIPTION	BY	ON	CHECKED	ON	APPROVED	ON
		DRAWN					

OWNER :	GAIL INDIA LIMITED
CONSULTANT:	**BRIDGE AND ROOF CO. (INDIA) LTD.** A GOVERNMENT OF INDIA ENTERPRISE. 427/1, GRAND TRUNK ROAD, HOWRAH–711101
PROJECT :	CITY GAS DISTRIBUTION NETWORK IN SIX GAs.
TITLE :	TYPICAL DETAILS OF DRS CUM DCU FOUNDATION

SCALE	JOB NO.	DRAWING NO.	SHT	REV
N.T.S	71150	BR-CGD-STD.-DWG-107	-	0



FIXING DETAILS



NOTES:-

1. ALL DIMENSIONS ARE IN MM. UNLESS NOTED OTHERWISE.
2. THE FULL WORKING AND SIZES ARE ONLY INDICATIVE AND ARE SUBJECT TO THE APPROVAL BY OWNER/OWNER'S REPRESENTATIVE BEFORE FABRICATION.
3. SCHEME FOR POWDER COATING AND COLOURING
   ONE COAT OF PRIMER & TWO COATS OF SPECIFIED PANTS
   ALL LETTERS EXCEPT "WARNING" TO BE PAINTED BLACK.
4. APPROVAL OF WARNING MARKER DESIGN SHALL BE OBTAINED BEFORE THE COMMENCEMENT OF WORK.

FOR TENDER PURPOSE ONLY

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BRIDGE AND ROOF CO. (INDIA) LTD.

REV / SEC	CONCURRED BY
△	

REV. NO.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISION		

REFERENCES | DRG. NO.

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SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

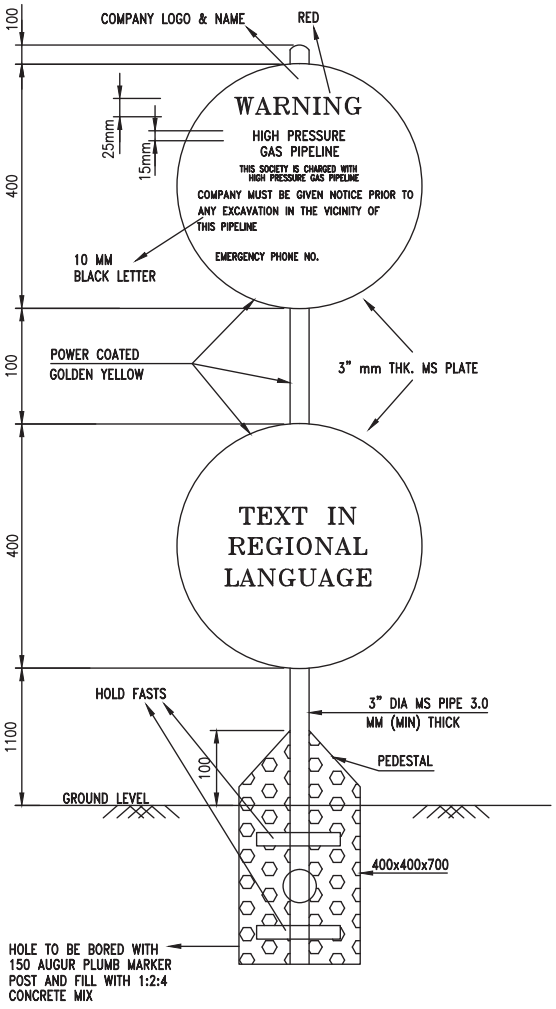
CNG & CITY GAS DISTRIBUTION PROJECT

POLE MARKER WITH FOUNDATION

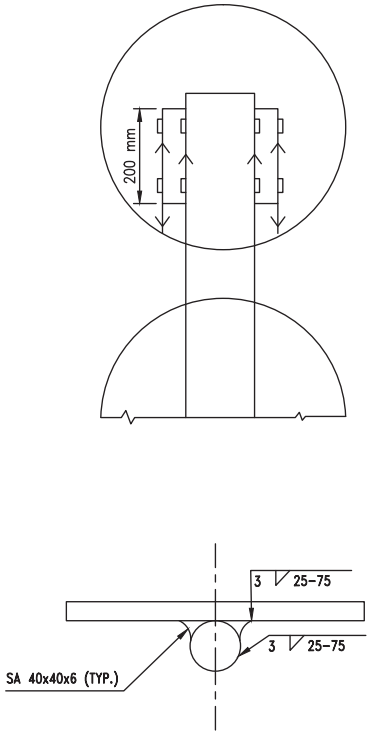
SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-16

GAIL_Internal



FIXING DETAILS



NOTES:-

1. ALL DIMENSIONS ARE IN MM. UNLESS NOTED OTHERWISE.
2. THE FULL WORKING AND SIZES ARE ONLY INDICATIVE AND ARE SUBJECT TO THE APPROVAL BY OWNER/OWNER'S REPRESENTATIVE BEFORE FABRICATION.
3. SCHEME FOR POWDER COATING AND COLOURING
   ONE COAT OF PRIMER & TWO COATS OF SPECIFIED PANTS
   ALL LETTERS EXCEPT "WARNING" TO BE PAINTED BLACK.
4. APPROVAL OF WARNING MARKER DESIGN SHALL BE OBTAINED BEFORE THE COMMENCEMENT OF WORK.

FOR TENDER PURPOSE ONLY

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			REVISION		

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SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

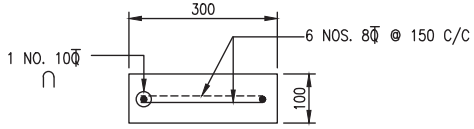
CNG & CITY GAS DISTRIBUTION PROJECT

POLE MARKER WITH FOUNDATION (INDIVIDUAL SOCITIES/AREAS)

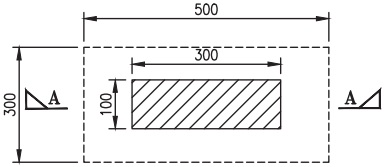
SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-17

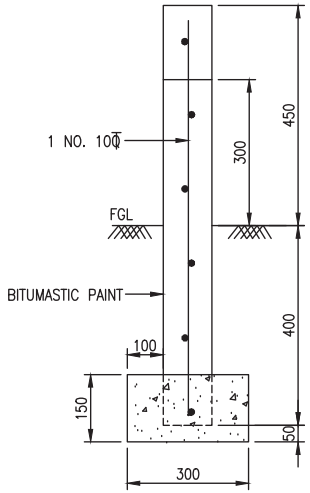
GAIL_Internal



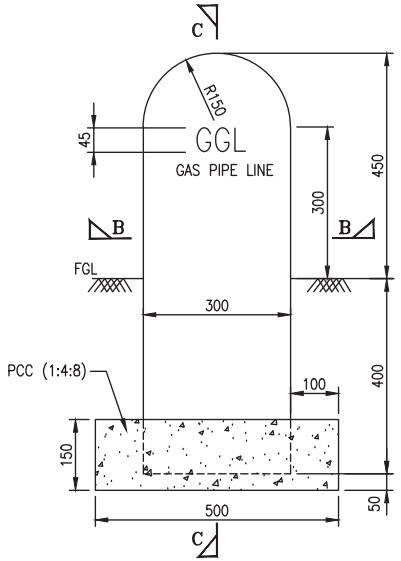
SECTION B–B



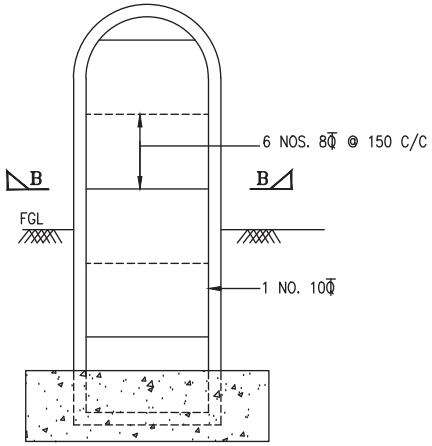
PLAN



SECTION C–C



SECTION A–A
(FOR DIMENSION)



SECTION A–A
(FOR REINFORCEMENT)

NOTES:–

1. DRAWING IS NOT TO SCALE.
2. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
3. MARKERS SHALL BE INSTALLED IN EVERY 50M INTERVAL AS PER INSTRUCTION OF ENGINEER-IN-CHARGE.
4. ALL BOUNDARY MARKERS SHALL BE PRECAST AND INSCRIPTIONS SHALL BE ENGRAVED 5mm DEEP IN THE MOULD ON BOTH FACE.
5. CONCRETE FOR BOUNDARY MARKER SHALL BE M20.

FOR TENDER PURPOSE ONLY

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			REVISION		

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CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

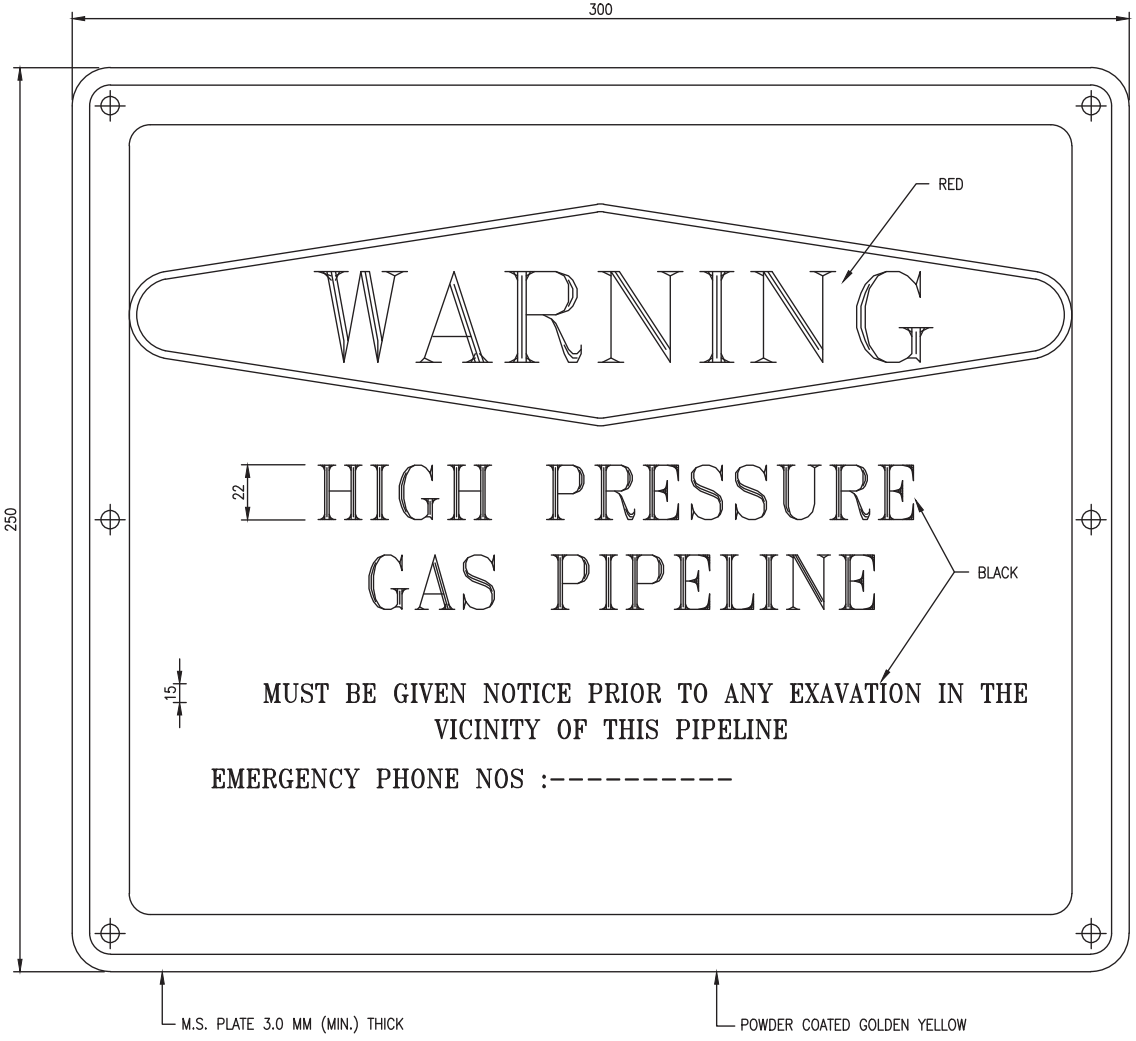
CNG & CITY GAS DISTRIBUTION PROJECT

SKETCH FOR RCC ROUTE MARKER

CALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.:- BR-CGD-STD-DWG-18

GAIL Internal



NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WRITEN DIMENSION ONLY. DO NOT SCALE.

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			REVISION		

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CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

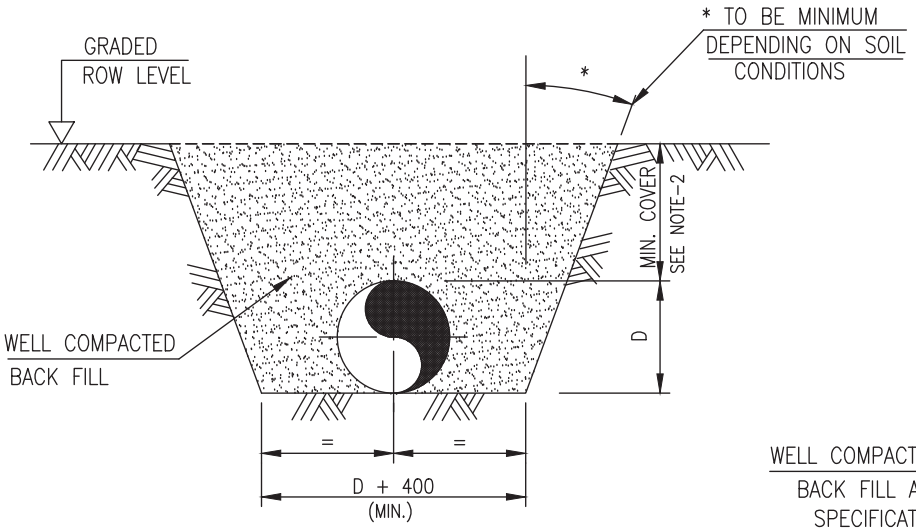
CNG & CITY GAS DISTRIBUTION PROJECT

PLATE MARKER

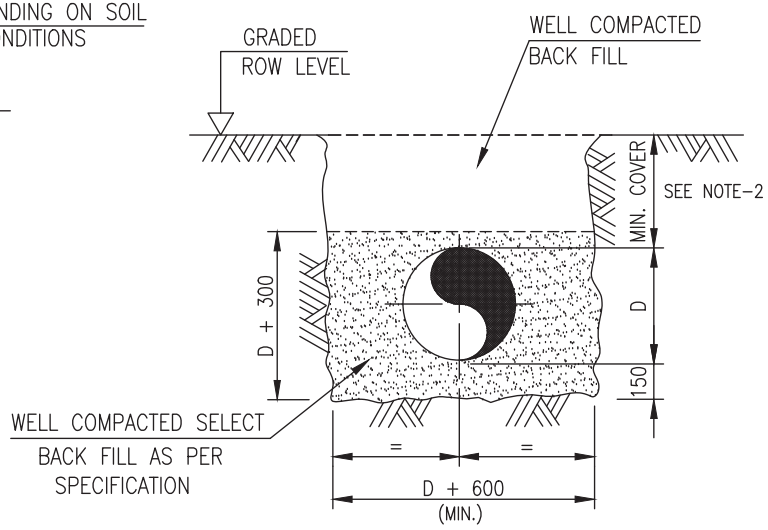
SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-19

GAIL_Internal



TRENCH IN NORMAL SOIL
TYPICAL SECTION



TRENCH IN CONSOLIDATED ROCK
TYPICAL SECTION

NOTES:-

1. ALL DIMENSIONS ARE IN MM. UNLESS SPECIFIED OTHERWISE.
2. FOR ALL PIPELINES TO BE CONSTRUCTED IN THE LAND UNDER JURISDITION OF GOVT. OF INDIA THE MINIMUM COVER TO BE ADOPTED SHALL BE 1000 MM. IN ACCORDANCE WITH GOVT. OF INDIA PETROLEUM PIPELINES (AQUISITION OF RIGHT OF USER IN LAND) ACT NO. 50,1962 AND AMENDMENT ACT NO. 13,1977. ANY EXTRA REQUIRMENT SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.
3. MINIMUM COVER REQUIREMENT SHALL BE SUBJECTED TO APPROVAL OF CONCERNED AUTHORITIES WHEREVER REQUIRED.
4. EXTRA COVER REQUIRMENT SHALL BE ESTABLISEHED AT ALL COVER BENDS, SAG BENDS AND HORIZONTAL BENDS WHEREVER REQUIRED.
5. FOR MINIMUM COVER REQUIRMENT AT PIPELINES CROSSING ROADS, RAILWAY TRACKS, RIVERS, MARSHY AREASETC, REFER RELEVENT STANDARDS.

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			REVISION		

REFERENCES DRG. NO.

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SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

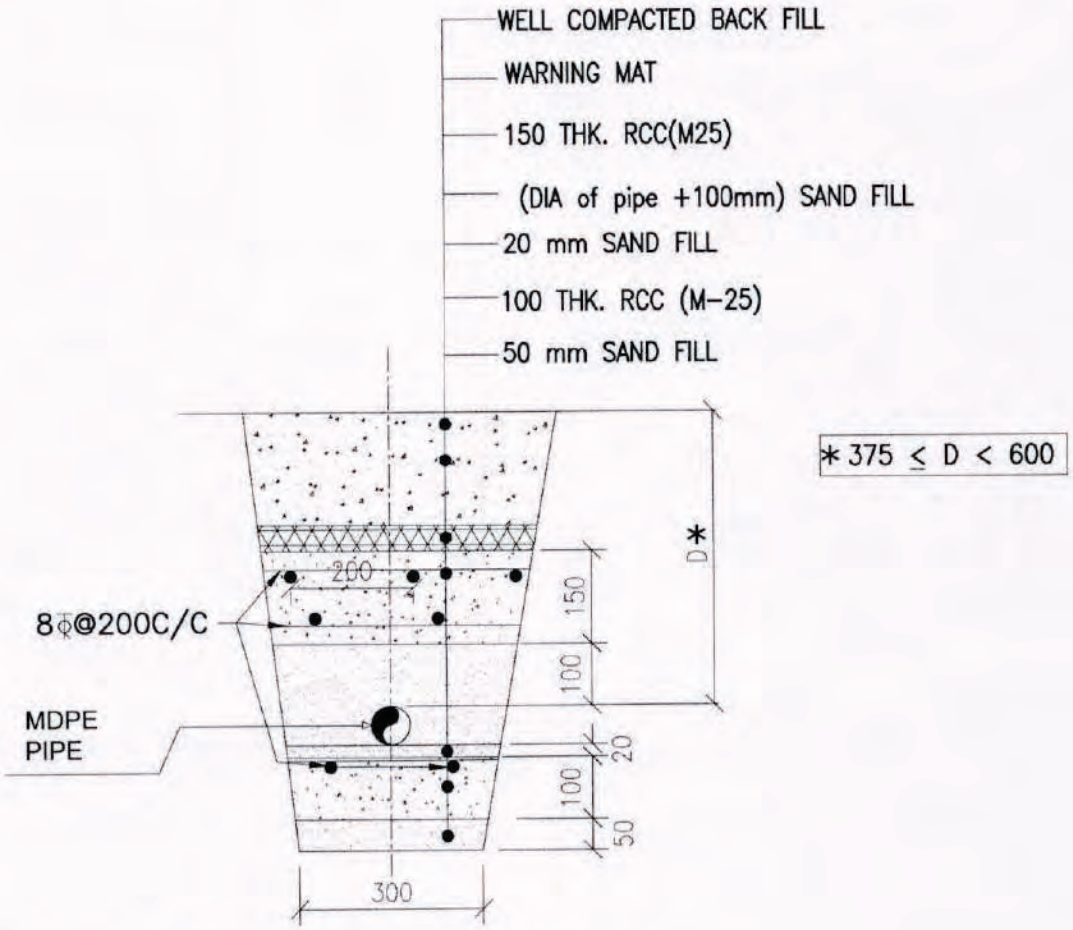
CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL TRENCH DIMENSIONS FOR PIPE LINE

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-20

GAIL Internal



SECTIONAL VIEW OF MITIGATION

NOTE:-
1. ALL DIMENSIONS ARE IN mm & LEVELS ARE IN M.

REV NO	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.
REVISIONS							

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SECTION	DESIGN DEPT.		
	NAME	SIG.	DATE
DESIGN			
DRAWN			
CHKD. & VERIFIED			
APPROVED			

CITY GAS DISTRIBUTION NETWORK

TYP. SECTIONAL VIEW OF MITIGATION FOR DEPTH 375 ≤ D ≤ 600

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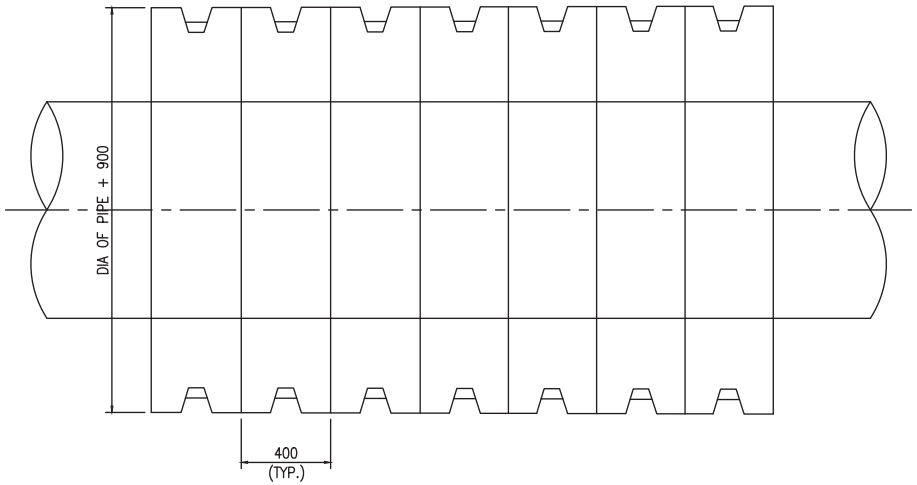
BRIDGE AND ROOF CO. (I) LTD

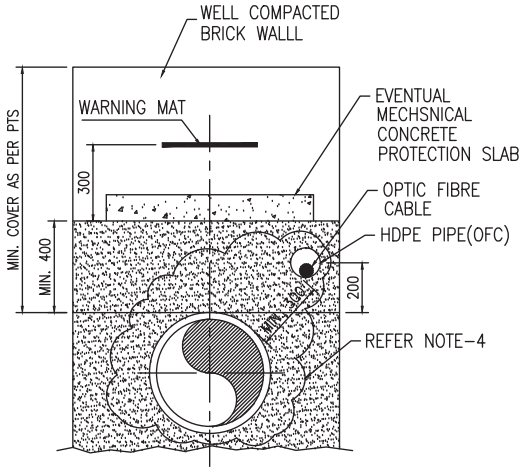
SCALE : NTS

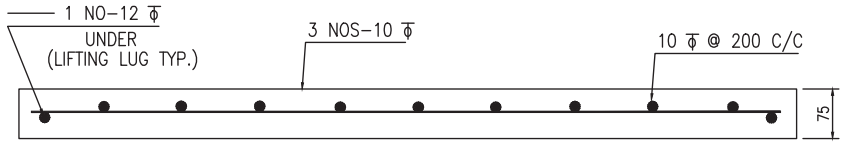
DRG. NO. - BR-CGD-STD-DWG-021

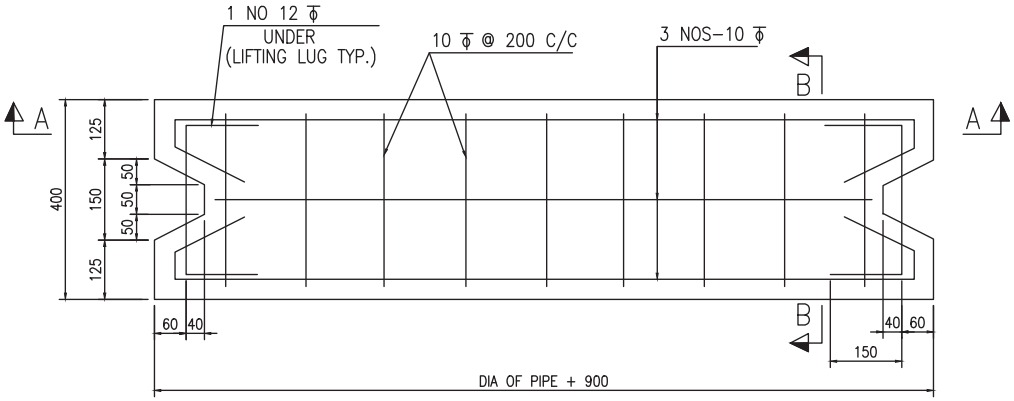
SHEET	REV
1	0



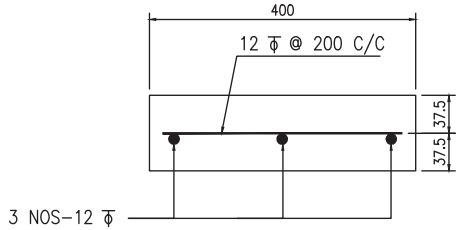
PROTECTIVE CONCRETE SLAB PLAN







REINF. DETAIL PROTECTIVE CONCRETE SLAB



SECTION B-B
(SCALE - 1:10)

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. MINIMUM COVER OVER LINE PIPE SHALL BE AS PER SPECIFICATION AND REQUIRMENT OF CONCERNED AUTHOTITIES.
3. THIS SKETCH IS INDICATIVE ONLY.
4. TYPE OF TRENCHING SHALL BE AS PER PTS AND APPROVED PROCEDURE.
5. CONCRETE MIX M20 SHALL BE USED.

FOR TENDER PURPOSE ONLY

GAIL Internal

REV / SEC						
CONCURRED BY						

REV. NO.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISION		

REFERENCES DRG. NO.

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SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

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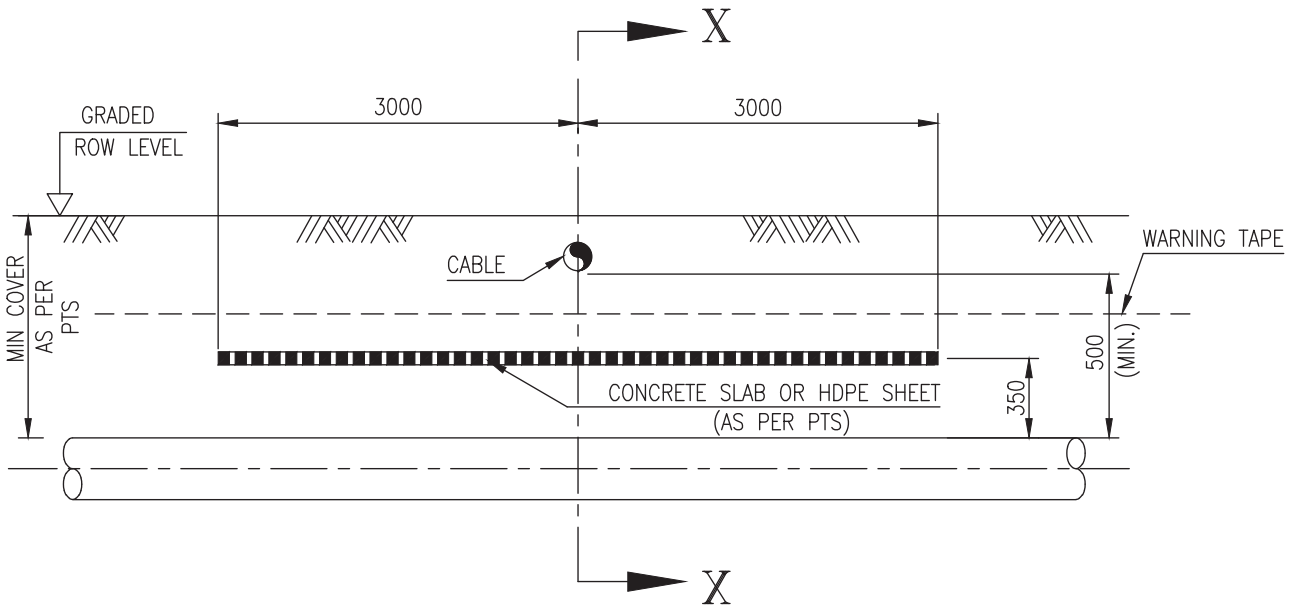
BRIDGE AND ROOF CO. (INDIA) LTD.

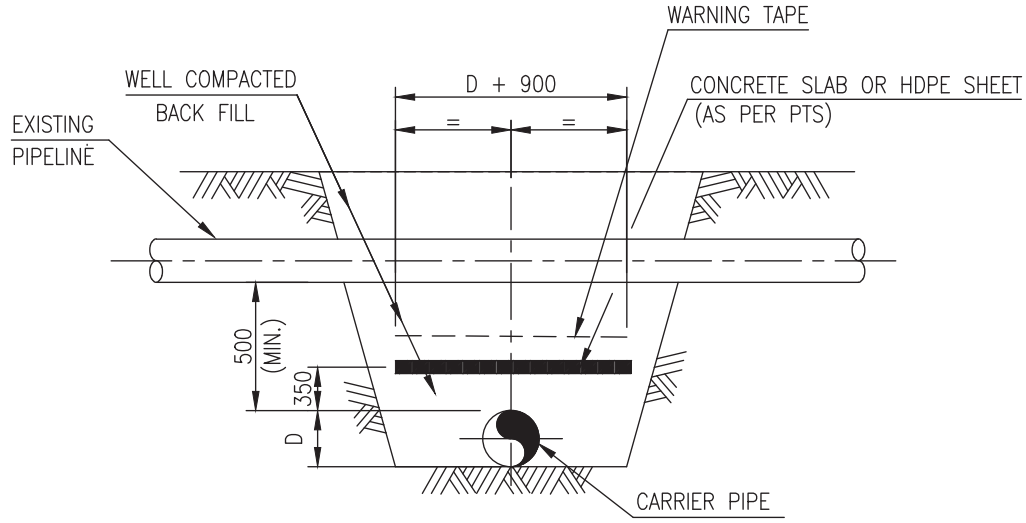
CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL MECHANICAL PROTECTION CONCRETE SLAB DETAILS

ALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-22





SECTION X–X

NOTES:–

1. ALL DIMENSIONS ARE IN MM. UNLESS SPECIFIED OTHERWISE.
2. A MODIFIED PIPELINE WARNING SIGN SHALL BE INSTALLED CLOSE TO THE CROSSING.
3. IN CASE OF ARMOUREWD OFC CABLE, CP BONDING IS NOT BE PROVIDED BETWEEN PIPELINE AN CABLE ARMOUR IN CASE OF UNARMOURED CABLE ARRANGEMENT FOR SHIELDIND (BY PROVIDING CASING ON EITHE SIDE OF THE PIPELINE OR CABLE) SHALL BE CONSIDERED.
4. FOR APPROVAL OF XING SHALL BE OBTAINED FROM CONCERNED AUTHORITIES.
5. FOR CONCRETE SLAB SHALL BE REFER STD. DRG. NO. MEC/TYP/05/28/STD/0007

FOR TENDER PURPOSE ONLY

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			REVISION		

REFERENCES DRG. NO.

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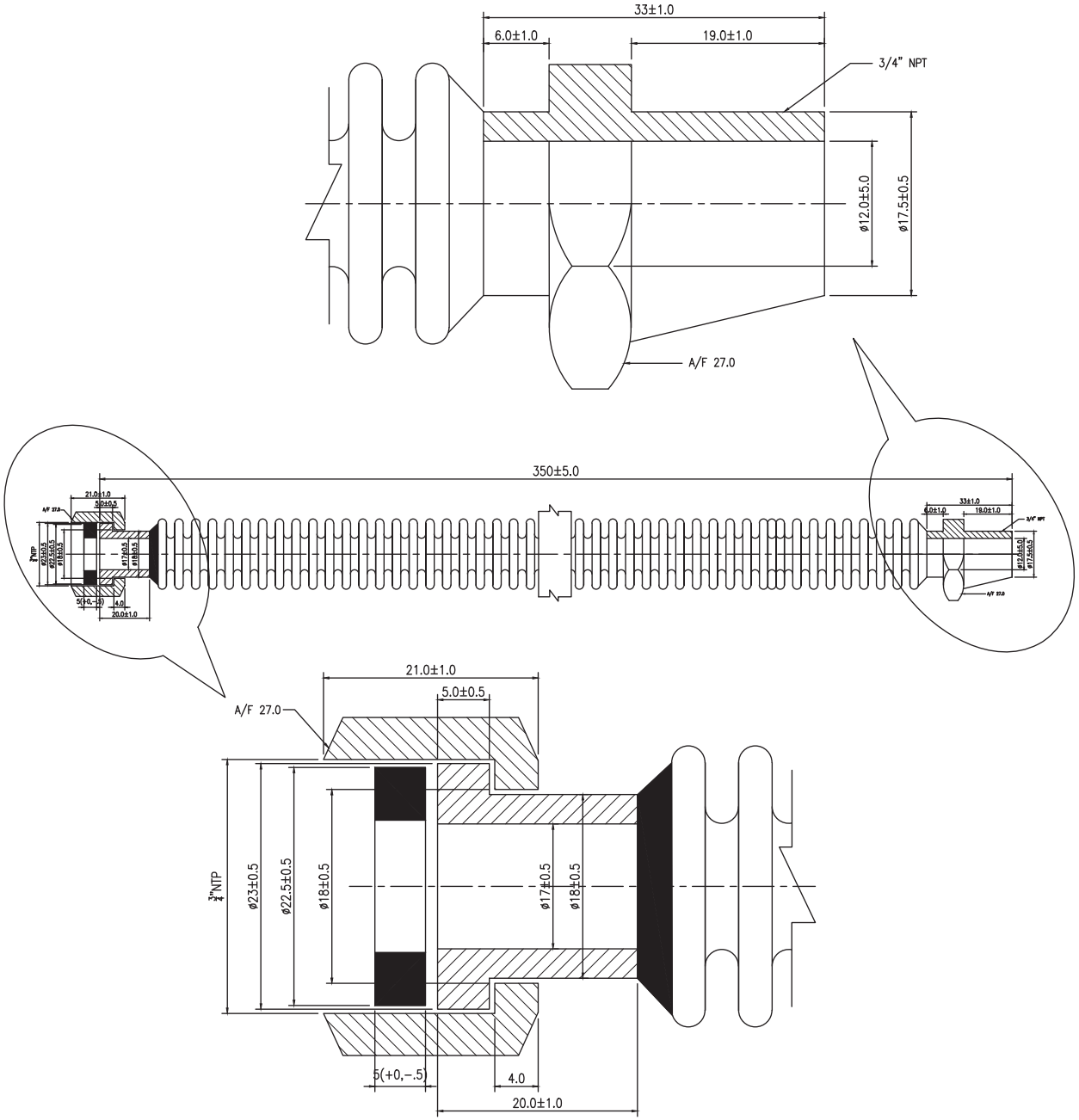
CNG & CITY GAS DISTRIBUTION PROJECT

TYPICAL UNDERGROUND CABLE CROSSING DETAILS

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-23

GAIL Internal



NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE.

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APPROVED	S.T
	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

HOSE ASSEMBLY FOR NATURAL GAS SERVICE

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-24

REFERENCES | DRG. NO.

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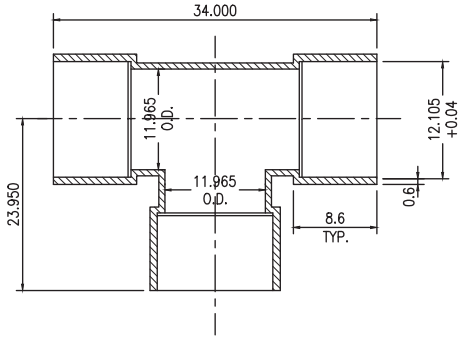
GAIL_Internal



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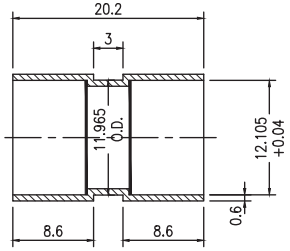
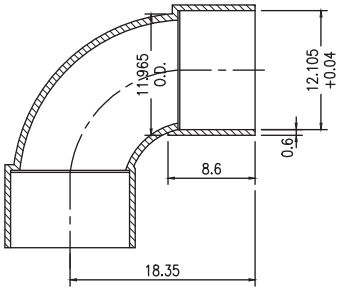


COUPLER

FITTING AS PER EN 1254 PART-1



90° ELBOW

FITTING AS PER EN 1254 PART-1

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE.
3. OPEN TOLRENCES ON DIMENSIONS SHALL BE AS PER EN 1254.
4. FOR DETAIL REFER SPEC NO.
5. THESE DRAWINGS ARE INDICATIVE ONLY. DETAIL DRAWING TO BE PREPARED BY THE VENDOR AS PER DESIGN CODE/MANUFACTURING STANDARD.

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APPROVED	S.T
	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

COPPER FITTING FOR NATURAL GAS SERVICE

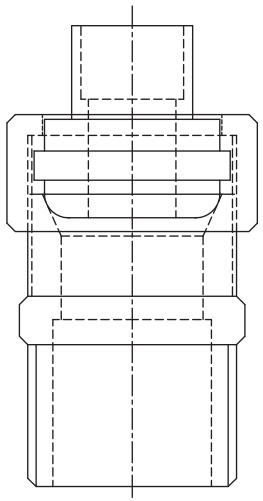
SCALE : N.T.S.

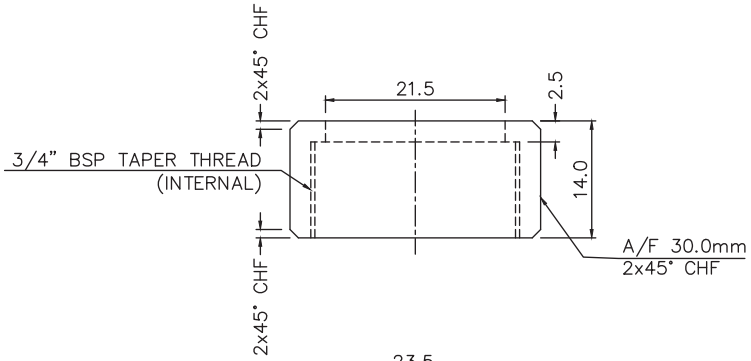
SHEET 1 OF 1

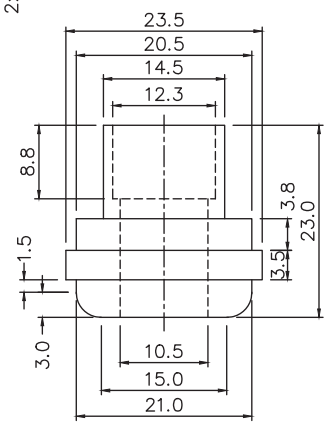
REV. 0

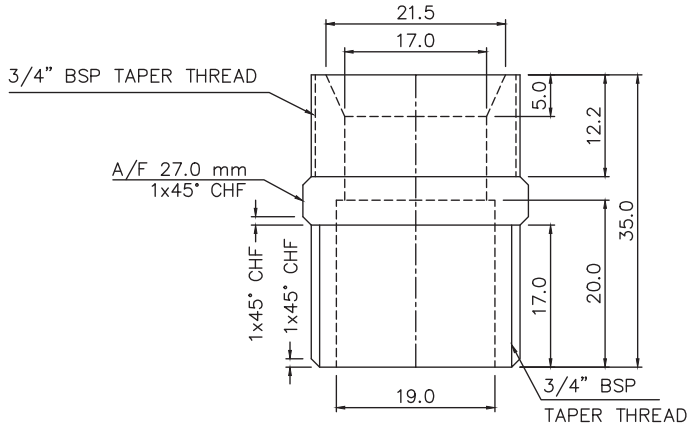
DRG. NO.- BR-CGD-STD-DWG-25

TYPICAL ASSEMBLY DRAWING









NOTES:-

1. MATERIAL SHALL CONFORM TO 319 : FREE CUTTING EXTRUDED BRASS ROD.
2. DIMENSIONS TOLERENCES SHALL BE AS PER BS 864 AND BS 21.
3. OPEN TOLERENCES ON DIMENSIONS SHALL BE +/- 0.1 mm.
4. THREADIND SHALL BE DONE AS PER BS 21.
5. ALL UNIONS BE LEAK TESTED AT 1 BAR.
6. ALL DIMENSIONS ARE IN MM.

FOR TENDER PURPOSE ONLY

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APPROVED	S.T
	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

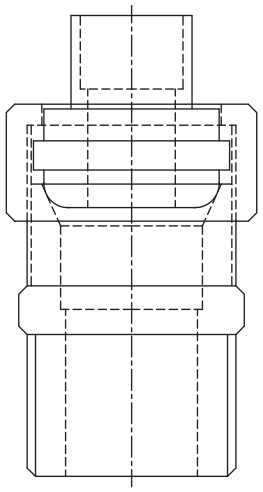
BRASS DISCONNECTING UNION 3/4" BSPT x 12mm (STRAIGHT)

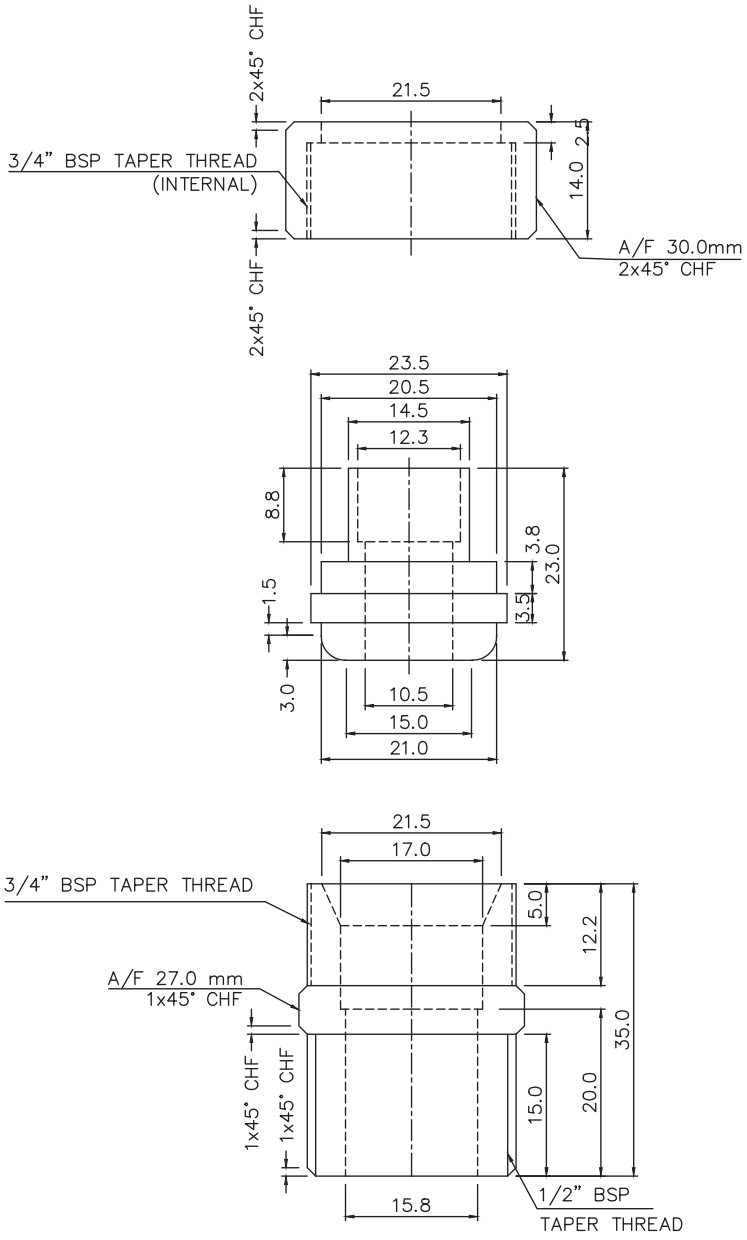
SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-26

GAIL_Internal

TYPICAL ASSEMBLY DRAWING





NOTES:-

1. MATERIAL SHALL CONFORM TO 319 : FREE CUTTING EXTRUDED BRASS ROD.
2. DIMENSIONS TOLERENCES SHALL BE AS PER BS 864 AND BS 21.
3. OPEN TOLERENCES ON DIMENSIONS SHALL BE +/- 0.1 mm.
4. THREADIND SHALL BE DONE AS PER BS 21.
5. ALL UNIONS BE LEAK TESTED AT 1 BAR.
6. ALL DIMENSIONS ARE IN MM.

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GAIL Internal

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			REVISION		

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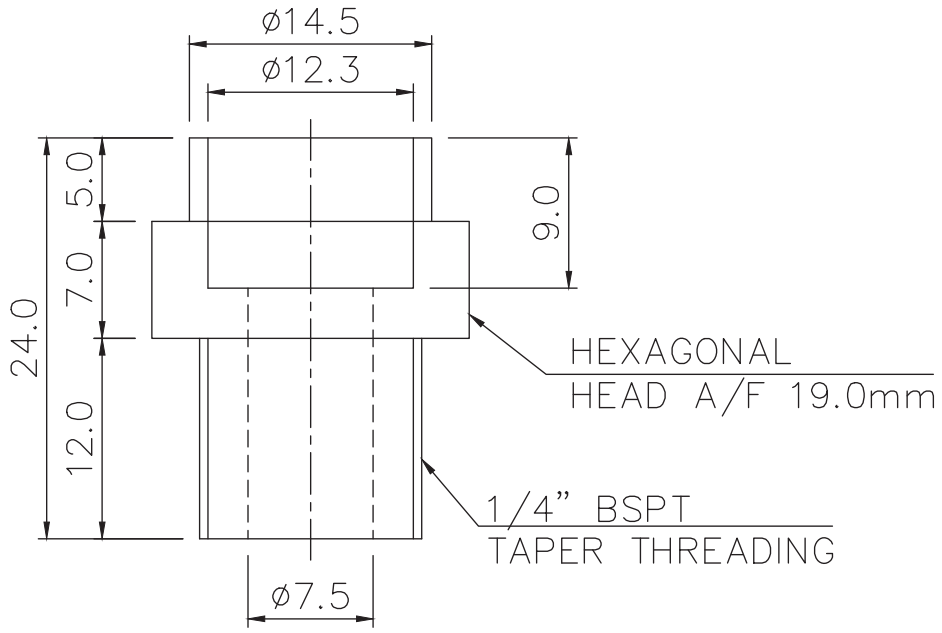
SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

BRASS DISCONNECTING UNION
1/2" BSPT x 12mm (STRAIGHT)

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.-BR-CGD-STD-DWG-27



NOTES:-

1. MATERIAL SHALL CONFORM TO IS : 319 FREE CUTTING EXTRUDED BRASS RODS.
2. DIMENSIONS TOLERENCES SHALL BE AS PER BS 864 AND BS 21.
3. OPEN TOLERENCES ON DIMENSIONS SHALL BE +/- 0.1 mm.
4. THREADIND SHALL BE DONE AS PER BS 21.
5. ALL UNIONS BE LEAK TESTED AT 1 BAR.
6. ALL DIMENSIONS ARE IN MM.

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SECTION	DESIGN DEPT.
LOCATION	HOWRAH OFFICE
DESIGNED	S.S.M
DRAWN	S.K
CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

BRASS ADOPTER
1/4" BSPT x 12mm (STRAIGHT).

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-28

REFERENCES | DRG. NO.

REV. NO. | DATE | ZONE | DESCRIPTION | BY | VERIFIED

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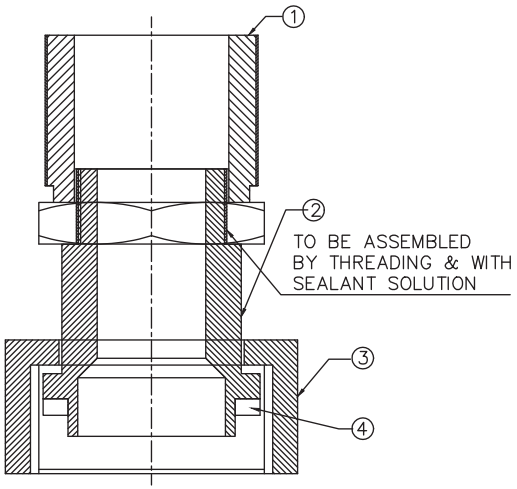
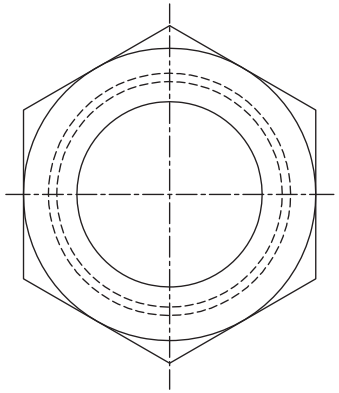
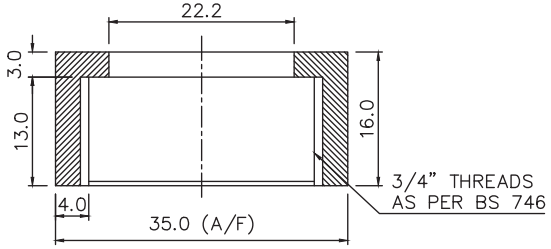
GAIL Internal

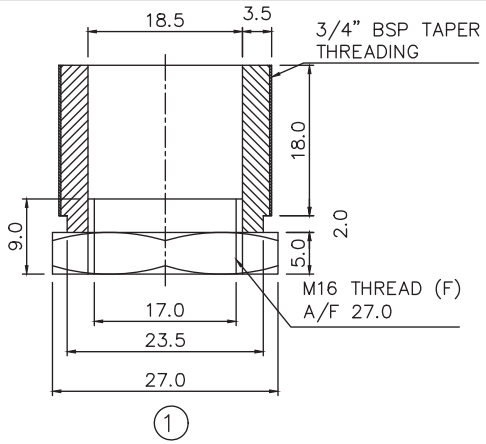


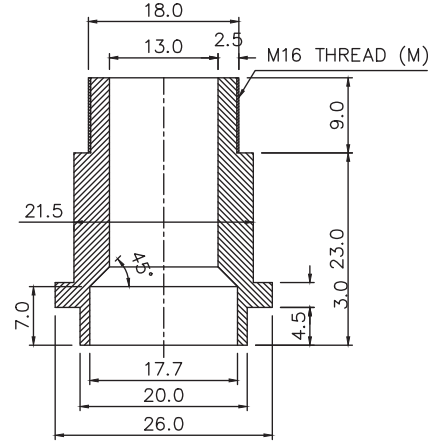
UNION ASSEMBLY

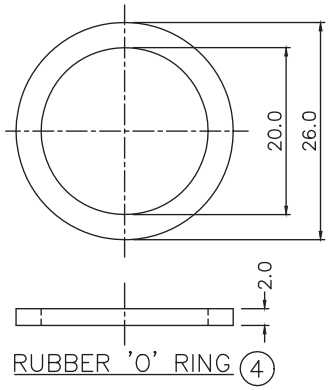




HEX. NUT (3)







RUBBER 'O' RING (4)

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL SHALL BE EXTRUDED FREE CUTTING BRASS ROD AS PER IS 319/BS EQUIVALENT.
3. RUBBER O RING MATERIAL WILL BE NITRAEL.
4. FOR DETAILS REFER TECHNICAL SPECIFICATION NO. MEC/TS/05/62/020B
5. O RING MATERIAL &SEALANT SOLUTION SHOULD BE SUITABLE FOR NATURAL GAS SERVICE.

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CHECKED AND VERIFIED	S.T
APPROVED	S.T
	16.05.2024

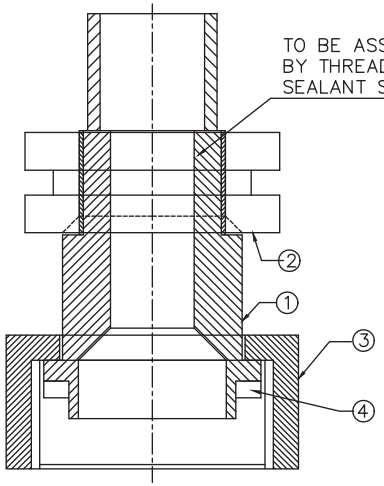
CNG & CITY GAS DISTRIBUTION PROJECT

METER INLET UNION
3/4" x 3/4"

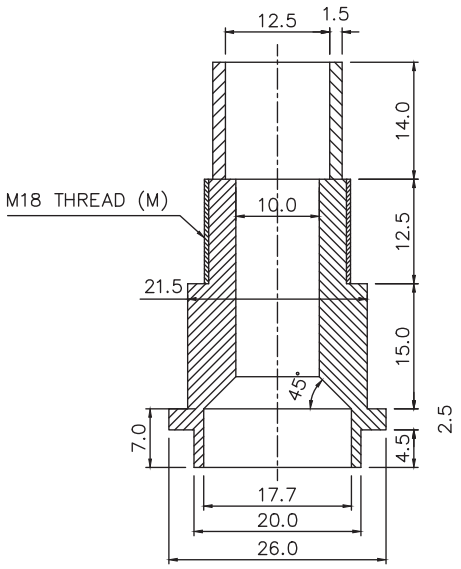
SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-29

GAIL Internal



UNION ASSEMBLY



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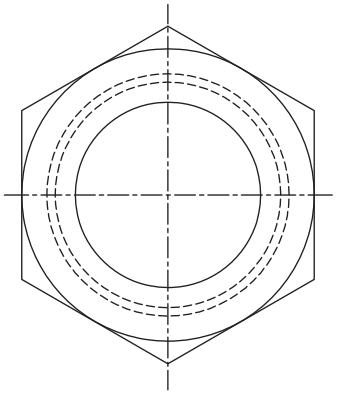
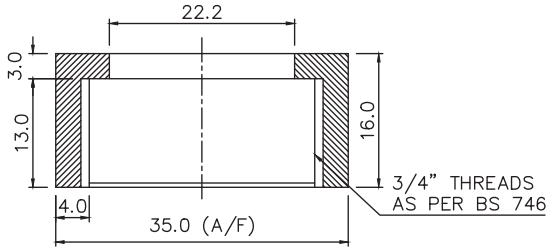
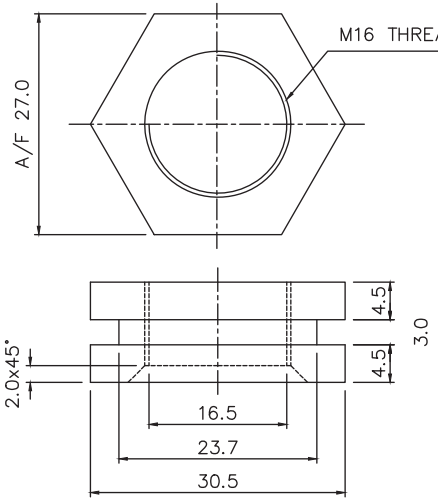




HEX. NUT ③



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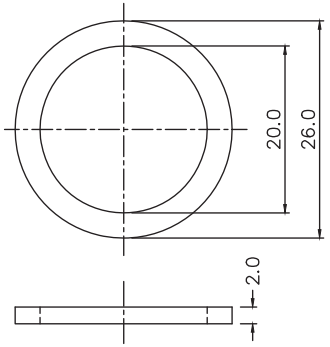

RUBBER 'O' RING ④

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL SHALL BE EXTRUDED FREE CUTTING BRASS ROD AS PER IS 319/BS EQUIVALENT.
3. RUBBER O RING MATERIAL WILL BE NITRAEL.
4. FOR DETAILS REFER TECHNICAL SPECIFICATION NO. MEC/TS/05/62/020B
5. O RING MATERIAL &SEALANT SOLUTION SHOULD BE SUITABLE FOR NATURAL GAS SERVICE.

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APPROVED	S.T
	16.05.2024

CNG & CITY GAS DISTRIBUTION PROJECT

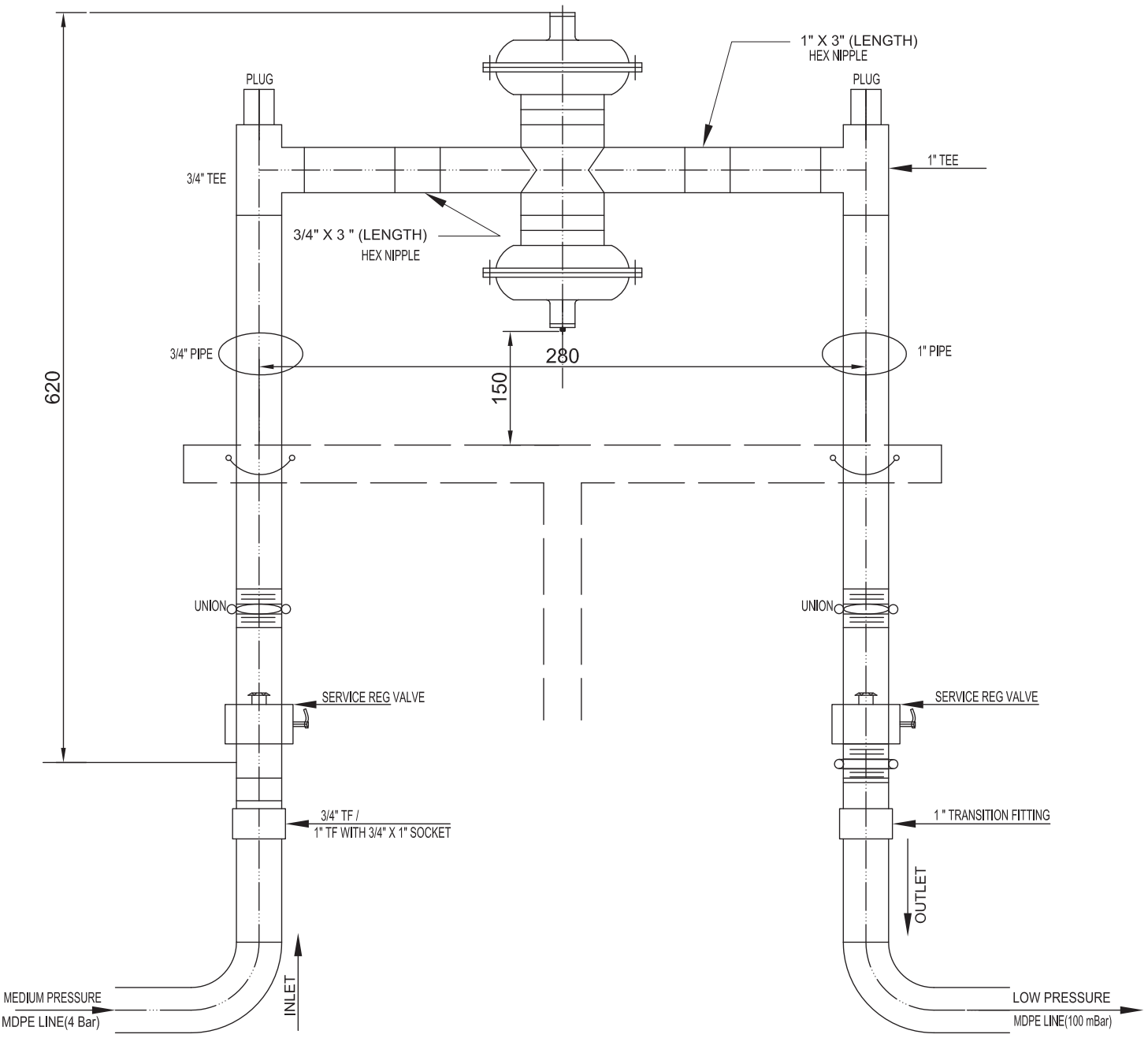
METER OUTLET UNION
3/4" x 12 mm (STRAIGHT)

SCALE : N.T.S. | SHEET 1 OF 1 | REV. 0

DRG. NO.- BR-CGD-STD-DWG-30

GAIL Internal

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT
BAIE_Internal



NOTE: ALL DIMENSION ARE IN mm.

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	NAME	SIGN. & DATE	SECTION :
DESIGNED	S.S.M	28.05.2024	
CAD	S.K	28.05.2024	SCALE :
REVIEWED	S.T	28.05.2024	SH.No. of
APPROVED			

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BRIDGE AND ROOF CO. (INDIA) LTD.

SCHEMATIC DIAGRAM FOR SINGLE STREAM SERVICE REGULATOR

 DRG. NO. - BR-CGD-STD-DWG-031

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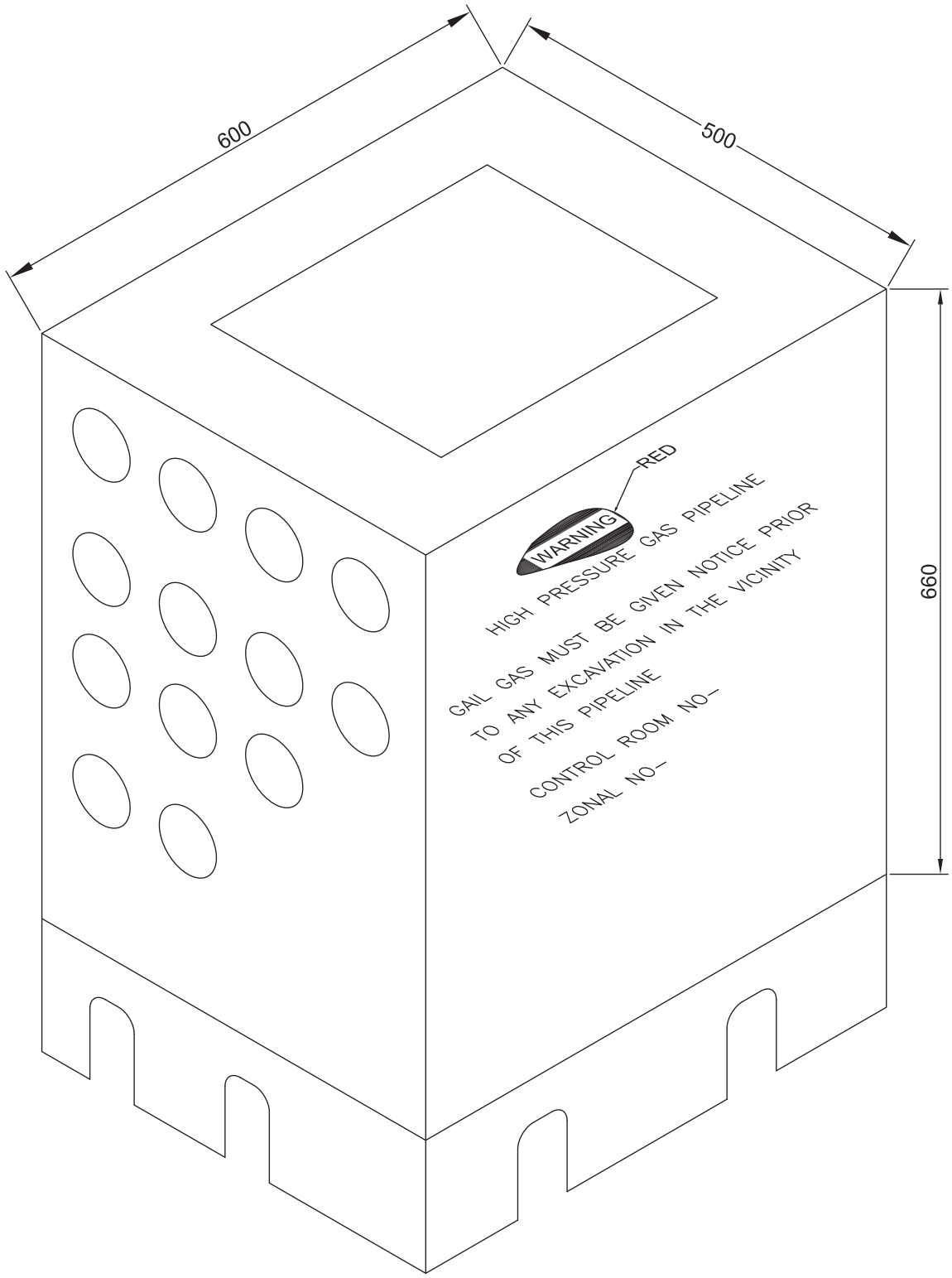

NOTE: ALL DIMENSION ARE IN mm.
THE HOUSING SHOULD BE OF FIBER REINFORCED PLASTIC (RFP)
40mm GROUTING WITH NON SHRIKAGE COMPUND SHALL BE PROVIDED AT BOTTOM OF SERVICE REGULATOR

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	NAME	SIGN. & DATE	SECTION :
DESIGNED	S.S.M	28.05.2024	
CAD	S.K	28.05.2024	SCALE : NTS
REVIEWED	S.T	28.05.2024	SH.No. of
APPROVED			

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ब्रिज एंड रूफ कंपनी (इंडिया) लिमिटेड

BRIDGE AND ROOF CO. (INDIA) LTD.

SCHEMATIC DIAGRAM OF HOUSING FOR SINGLE SERVICE REGULATOR

 DRG. NO. - BR-CGD-STD-DWG-032

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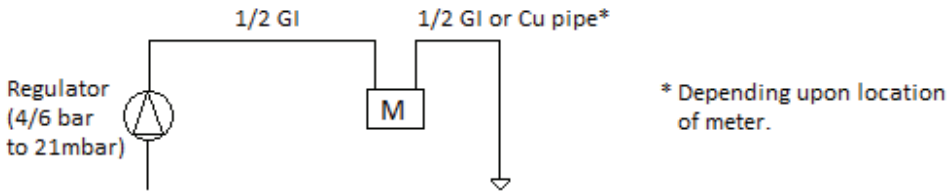
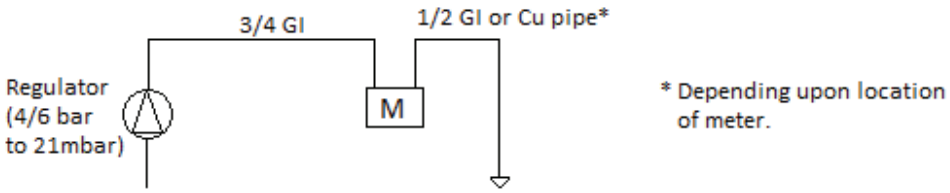
Schemes for GI Piping for Domestic Consumers

Scheme 1- For Independent house upto G+2:



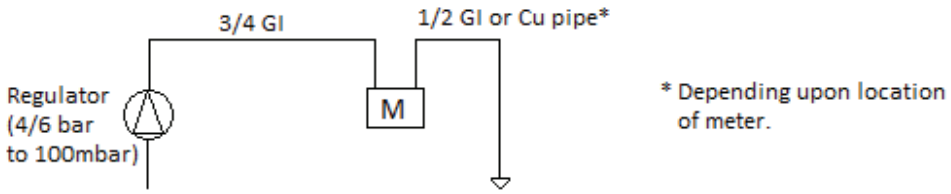
- Regulator shall be of range **from 4/6 bar to 21mbar**.
- Pipe from outlet of regulator to inlet of meter shall be **1/2" GI pipe**.
- From outlet of meter, **1/2" GI pipe or Copper pipe** shall be used depending upon the location of installation of domestic meter.

Scheme 2- For High-Riser society from G+3 to G+7:



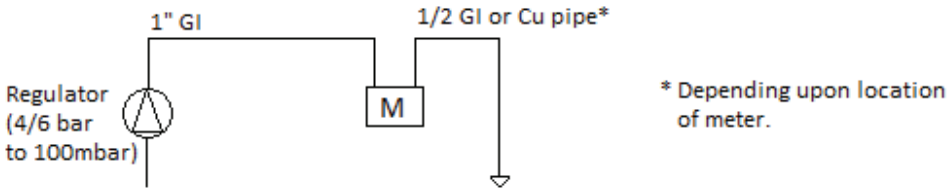
- Regulator shall be of range **from 4/6 bar to 21mbar**.
- Pipe from outlet of regulator to inlet of meter shall be **3/4" GI pipe**.
- From outlet of meter, **1/2" GI pipe or Copper pipe** shall be used depending upon the location of installation of domestic meter.

Scheme 3- For High-Riser society from G+8 to G+12:



- Regulator shall be of range **from 4/6 bar to 100mbar**.
- Pipe from outlet of regulator to inlet of meter shall be **3/4" GI pipe**.
- From outlet of meter, **1/2" GI pipe or Copper pipe** shall be used depending upon the location of installation of domestic meter.

Scheme 4- For High-Riser society from G+13 to G+20:



- Regulator shall be of range **from 4/6 bar to 100mbar**.
- Pipe from outlet of regulator to inlet of meter shall be **1" GI pipe**.
- From outlet of meter, **1/2" GI pipe or Copper pipe** shall be used depending upon the location of installation of domestic meter.

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CHECK – LIST For Domestic Connection

Society's Name: _____ Contractor's Name: _____

Area: _____ Date: _____

		Status As on dated	If No, then target Date	Completion Date
1.	Availability of As-build drawings (Hard & Soft copy):	YES ☐ NO ☐		
2.	Restoration properly done & NOC Obtained from society:	YES ☐ NO ☐		
3.	Sleeve Restoration properly done:	YES ☐ NO ☐		
4.	Sand filled inside the Sleeve up to the top level:	YES ☐ NO ☐		
5.	2 No's of Clamps fitted in the GI pipe below Regulator:	YES ☐ NO ☐		
6.	All Regulator joints & Isolation Valves are Leak proof:	YES ☐ NO ☐		
7.	Proper Painting, Clamping of GI Pipes and Hole Cementing done:	YES ☐ NO ☐		
8.	Valve Chamber is properly made with proper Cover on it:	YES ☐ NO ☐		
9.	Extra Earth/ Material removed from the Society premises:	YES ☐ NO ☐		
10.	RFC & Conversion data (Handover Data) submitted:	YES ☐ NO ☐		
11.	House Consent forms forwarded to Marketing:	YES ☐ NO ☐		
12.	Pole/ RCC/ Plate Markers properly installed:	YES ☐ NO ☐		
13.	Other Check Points (if any):			

_____

_____

_____

_____

_____

_____

GAIL(I) (Signature of O&M Personal) (Signature of Projects Contractor)

(Signature of O&M In-charge) (Signature of Projects In-charge)

Standard Work Procedure (SWP) G I & Meter Installation

1. Route Survey

1	Initial survey to finalise route of GI Piping to be done by Contractor & EIC/PMC to confirm feasibility and acceptance of custom
2	Hand sketch of route to be signed by Customer,Contractor & EIC/PMC.
3	Route to be finalized ensuring proper ventilation.
4	conceled piping is strictly not allowed

2. GI Installation

1	All the machinery & adequete manpower should be availiable at site (by contractor) before commencement of work.
2	Test Report of all the bought out items to be submitted by contractor
3	All pipes should be vertically plumbed.
4	clamping must be provided on either sides of each fitting with maximum of 150 mm gap.
5	Minimum 2 Clamps must be provided in to support 1.5 m 1/2" dia GI pipe below regulator
6	One clamp must be provided above regulator with maximum gap of 150 mm.
7	At each service tee there should be provision of isolation valve (3/4").
8	Minimum offset distance from riser and hole piece should be 150mm.
9	Hole piece must pass through PVC pipe.
10	In case of approach riser, all droppings must have individual valves.
11	All pipings must be visible and installed in ventilated area.
12	kitchen should have sufficient ventilation.
13	One coat Zinc based primer
14	Two coats paint of synthetic enamel caneery yellow (Asian,Nerolack, Burger or as per Tech Spec.) per coat 30 micron must be applied prior to installation of pipes and same is not applicable in case of powder coated GI pipe and fitting.
15	All fittings must be painted after testing of instllation.
16	Minimum distance between Electral items like points/wiring/cable etc. and installation of GI pipe shall be 300-500 mm or if distance is not adequete then GI pipe shall be covered with PVC sleeve.
17	GI installation shall not be done below kitchen platform .
18	GI routing on wooden /False ceiling is not permitted.

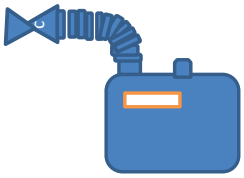
3. GI Testing

1	At the time of riser testing all isolation valves must be in opened and plugged condition.
2	Riser testing should be done at 2.2Kg/cm^2 pressure and it should be witnessed for two to four hours.
3	Pressure gauge used for testing must be (0-4) Kg/Cm^2 and it must be within calibration period.
4	Calibration certificates of pressure gauge must be approved by EIC or PMC and signed seal must be sticked on the gauge.
5	After testing of riser it must be socket plugged which indicates that riser has been tested.
6	Riser measurement must be done prior to testing and measurement sheet report is to be signed by EIC/PMC.
7	Customer must be informed about extra piping if applicable and extra piping consent is to be signed by customer.
8	Plate marker at TF point is to be ensure before final gas charging.
9	After testing final touch up of painting is to be done as per requirement.

4. Meter Installation

1	Meter must be installed in ventilated location.
2	Flexible hose pipe should be used in 3 patterns as shown in figure below.
3	Isolation Valve inside kitchen must be on maximum height of 2.0 m from ground level.
4	All pipings inside kitchen must be minimum 300-500 mm away from electric wires.
5	Gas piping should not cross over any electric line.
6	Distance from appliance valve and gas burner must be minimum of 1000 mm.
7	Piping must not run over gas burner.
8	PVC clamp must be on either side of each bend in copper piping.
9	One supporting PVC clamp must be provided just before Appliance Valve.
10	GI installation shall not be done below kitchen platform .

11	Selection of GI/Cu, From Meter outlet to Appliance valve will be decided by customer.

5. Online Tapping

1	All work to carried out in the presence of PMC/EIC only.
2	Tapping in front of all probable houses(domestic consumer) is to be done.
3	Shut down form to be filled and signed by connected consumers.
4	Isolation Valve to be installed in balance tap offs and it must be plugged.
5	Inform connected consumers that gas is available and take there initials.
6	Internal testing from the "Isolation valve of service tee" upto the "Appliance Valve" with meter to be done at not more than 400 millibar with manometer or diaphragm gauge with MCV in open condition.
7	At the time of comissioning ensure that there is no leakage from the Isolation Valve with soap solution.
8	Presence of fire extiguisher must at the time of online tapping.

6. Meter testing/Ready for conversion (RFC) Checklist

1	GI Sleeves shall be properly sand filled.
2	Ensure proper clamping & painting of the installation.
3	Ensure riser testing is done. Also make sure that socket is plugged.
4	Holes for filled with cement mortar.
5	Make sure that all other Isolation Valves are closed except of those whose RFC's are to be done.
6	Ensure no leakage in Regulator assembly by soap solution test also HEX nipple on inlet and outlet side of all type regulator is to be ensure.
7	Ensure that Copper Pipe Clamping has been properly done alongwith leaqure coating
8	Internal Testing (from Meter inlet to Appliance valve) is to done at 100 mbar for a duration of 3 minutes.
9	Socket Plugged after RFC.
10	Safety Manual Chart to be provided to the customer.
11	Obtain feed back form duly signed by the customer.
12	Emergency Phone No. stickers to be stuck over the meter bearing the initial of TPI with date.

7. Conversion Checklist

1	Make Sure that socket is plugged and is RFC done before NG conversion.
2	Nozzles should be changed.
3	New Hose Pipe to be provided & C clamped on both ends.
4	Old nozzles should be handed over to the customer.
5	Soap solution test to be carried out.
6	Portable Fire Extinguisher should be carried at the time of conversion.
7	After NG JMR is to be filled and duly signed by Customer,Contactor & EIC/PMC

Note:-

1 This Procedure is to be read along with PNGRB and T4S Guidelines.

Ref. No.:		Project: CITY GAS DISTRIBUTION PROJECT, ----------

PNG CONNECTION JOB CARD

CUSTOMER DETAIL		TECHNICAL DETAILS
APPLICATION NO: CUSTOMER NAME: HOUSE NO.LANDMARK CITY	SERVICE ORDER NO. STREET AREA CONTACT NO.	METER NO. IMR METER LOCATION Inside/ Outside Kitchen INSTALLATION DATE TESTING DATE CONVERSION DATE

BILL OF MATERIAL

S.No.	Material Description	SIZE	Unit	Quantity	S.No.	Material Description	SIZE	Unit	Quantity
1	GI PIPE	1/2"	Mtr.		7	BURNER	-----	Nos.	
2	GI PIPE	3/4"	Mtr.		8	PEDESTRAL	-----	Nos	
3	COPPER PIPE	12 mm	Mtr		9	WARNING PLATE	-----	Nos.	
4	APPLIANCE VALVE	1/2"	Nos.		10				
5	ISOLATION VALVE	1/2"	Nos		11				
6	ISOLATION VALVE	3/4"	Nos.		12				

I hereby confirm that Meter Installation and routing of GI and Copper Pipes were carried out by GAIL(I) in my house has been done to the best of my satisfaction.	Contractor name:- SIGN DATE	**GAIL(I)/CONSULTANT** SIGN DATE

Contractor's Logo	
PNEUMATIC TESTING REPORT GI installation from regulator outlet to appliance valve (except meter) & meter testing	

Ref. No.: Project:CITY GAS DISTRIBUTION PROJECT , ----------

Project: City Gas Distribution at ----------			
Client: M/s GAIL(I)			
Consultant:			
Contractor:		Location:	
Address of Quarter:		Service Order No./PO no.:	
Details :-			
1	Sizes of GI : ½" ,¾" ,1"	6	Start Time :_____DATE :____/_____/_____
2	Total Length of the pipe: _____ mtr.	7	Holding Time: 04 Hrs.
3	Whether Meter removed: Y / N	8	Pressure Gauge Make & No.:_____
4	Testing Medium: Compressed air (oil free)	9	Gauge calibration valid up to: ____/____/_____
5	Testing Pressure: 02 bar	10	Whether Leakage observed by applying soap solution: Y / N

Observation Chart *from regulator outlet to appliance valve (except Meter)*:

S.No.	Time	Reading (Kg.f/cm²)	S.No.	Time	Reading (Kg.f/cm²)
1.			5.		
2.			6.		
3.			7.		
4.			8.		

Observation in separate Meter Testing:

1	Test pressure for separate Meter testing: 100mbar
2	Holding Time for separate Meter testing: 15 minutes
3	Whether Pressure drop observed:

Contractor	CONSULTANT	GAIL(I)

STANDARD WORK PROCEDURE FOR PE LAYING AND GI WORKS

Project: City Gas Distribution Projects

Client: M/s GAIL(I)

Consultant:

Contractor:

Standard Work Procedure (SWP) For G I & Meter Installation

1. Route Survey

1	Initial survey to finalize route of GI Piping to be done by Contractor & EIC/PMC to confirm feasibility and acceptance of customer.
2	Hand sketch of route to be signed by Customer, Contractor & EIC/PMC.
3	Route to be finalized ensuring proper ventilation.
4	Concealed piping is strictly not allowed

2. GI Installation

1	All the machinery & adequate manpower should be available at site (by contractor) before commencement of work.
2	Test Report of all the bought out items to be submitted by contractor
3	All pipes should be vertically plumbed.
4	Clamping must be provided on either sides of each fitting with maximum of 150 mm gap.
5	Minimum 2 Clamps must be provided in to support 1.5 m 1/2" dia. GI pipe below regulator
6	One clamp must be provided above regulator with maximum gap of 150 mm.
7	At each service tee there should be provision of isolation valve (3/4").
8	Minimum offset distance from riser and hole piece should be 150mm.
9	Drill holes must pass through PVC pipe.
10	In case of approach riser, all droppings must have individual valves.
11	All piping must be visible and installed in well-ventilated area.
12	Kitchen room shall have sufficient ventilation.
13	One coat Zinc based primer
14	Two coats of synthetic enamel canary yellow paint (Asian, Nerolac, Berger or as per Tech Spec.) per coat 30 micron must be applied prior to installation of pipes and same is not applicable in case of powder coated GI pipe and fitting.
15	All fittings must be painted after testing of installation.
16	Minimum distance between Electrical items like points/wiring/cable etc. and installation of GI pipe shall be 300-500 mm or if distance is not adequate then GI pipe shall be covered with PVC sleeve.
17	GI installation shall not be done below kitchen platform.
18	GI routing on wooden /false ceiling is not permitted.

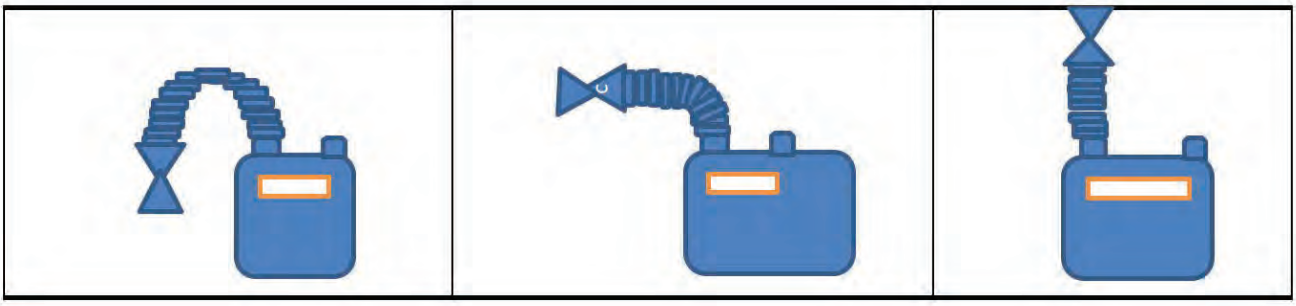
STANDARD WORK PROCEDURE FOR PE LAYING AND GI WORKS

3. GI Testing

1	At the time of riser testing all isolation valves must be in opened and plugged condition.
2	Riser testing should be done at 2.2Kg/cm^2 pressure and it should be witnessed for two to four hours.
3	Pressure gauge used for testing must be (0-4) Kg/Cm^2 and it must be within calibration period.
4	Calibration certificates of pressure gauge must be approved by EIC or PMC and signed seal must be pasted on the gauge.
5	After testing of riser it must be socket plugged which indicates that riser has been tested.
6	Riser measurement must be done prior to testing and measurement sheet report is to be signed by EIC/PMC.
7	Customer must be informed about extra piping if applicable and extra piping consent is to be signed by customer.
8	Plate marker at TF point is to be ensured before final gas charging.
9	After testing final touch up of painting is to be done as per requirement.

4. Meter Installation

1	Meter must be installed in ventilated location.
2	Flexible hose pipe should be used in 3 patterns as shown in figure below.
3	Isolation Valve inside kitchen must be on maximum height of 2.0 m from ground level.
4	All GI piping inside kitchen must be minimum 300-500 mm away from electric wires.
5	Gas piping should not cross over any electric line.
6	Distance from appliance valve and gas burner must be minimum of 1000 mm.
7	Piping must not run over gas burner.
8	PVC clamp must be on either side of each bend in copper piping.
9	One supporting PVC clamp must be provided just before Appliance Valve.
10	GI installation shall not be done below kitchen platform.
11	Selection of GI/Cu, From Meter outlet to Appliance valve will be decided by customer.
12	GI pipe clamping and routing through wooden surface must be avoided.



5. Online Tapping

1	All work to carried out in the presence of PMC/EIC only.
2	Tapping in front of all probable houses (domestic consumer) is to be done.
3	Shut down form to be filled and signed by connected consumers.
4	Isolation Valve to be installed in balance tap offs and it must be plugged.
5	Inform connected consumers that gas is available and take their initials.
6	Internal testing from the "Isolation valve of service tee" up to the "appliance Valve" with meter to be done at not more than 400 mbar with manometer or diaphragm gauge with MCV in open condition.

7	At the time of commissioning ensure that there is no leakage from the Isolation Valve with soap solution.
8	Presence of fire extinguisher must at the time of online tapping.

6. Meter testing/Ready for conversion (RFC) Checklist

1	GI Sleeves shall be properly sand filled.
2	Ensure proper clamping & painting of the installation.
3	Ensure riser testing is done. Also make sure that socket is plugged.
4	Holes for filled with cement mortar.
5	Make sure that all other Isolation Valves are closed except of those whose RFC's are to be done.
6	Ensure no leakage in Regulator assembly by soap solution test.
7	Ensure that Copper Pipe Clamping has been properly done along with lacquer coating.
8	Internal Testing (from Meter inlet to Appliance valve) is to done at 100 mbar for a period of 3 minutes.
9	Socket Plugged after RFC.
10	Safety Manual Chart to be provided to the customer.
11	Obtain feedback forms duly signed by the customer.
12	Emergency Phone No. stickers to be stuck over the meter bearing the initial of TPI with date.

7. Conversion Checklist

1	Make Sure that socket is plugged and is RFC done before NG conversion.
2	Nozzles should be changed.
3	Suraksha Rubber Hose Pipe to be provided & C clamped on both ends.
4	Old nozzles should be handed over to the customer.
5	Soap solution test to be carried out.
6	Portable Fire Extinguisher should be carried at the time of conversion.
7	After NG JMR is to be filled and duly signed by Customer, Contactor & EIC/PMC

Note:-

This Procedure is to be read along with PNGRB and T4S Guidelines.

CHARGING PLAN/PROCEDURE

Project: City Gas Distribution Projects

Client: GAIL(I)

Consultant:

Contractor:

Date of charging: -

S. No.	Description	Details				
1	N_2 Purging Detail	Purging Date: -				
		Number of nitrogen cylinder consumed: -				
2	Length of PE P/L Pneumatically Tested and flushed as well as cleaned (m)	Date of Pneumatic testing: -				
		Type/size	ø125	ø63	ø32	ø20
		Revived PE line				
		New PE line				
		Total (meter)				
3	No of PE Isolation Valve Chamber (in Nos.): -					
4.	Check List: -					
a)	Isolation valve plugged	Yes / No /NA				
b)	Any Exposed Pipe	Yes / No				
c)	RCC/Plate/Pole Markers installation	Yes / No				
d)	Charging Tools available	Yes / No				
e)	As-built Drawing	Yes / No				
f)	Certificates confirming nitrogen available	Yes / No				
g)	Fire Extinguisher / Gas Detector	Yes / No				
h)	Sleeves / half round filled with sand	Yes / No/NA				
i)	Valve Chamber construction done	Yes / No/NA				
j)	Safety equipment /First Aid available	Yes / No				
k)	Emergency Nos.provided to the society	Yes / No / NA				

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ACTIVITY/PROCEDURE FOR CHARGING

Sr. No.	Steps to be followed	Activity Description
1.	**Integration of PE network to be charged**	Ensure that 125mm primary/main line is integrated with 63mm secondary line and further integrated with 32mm/20mm service line. If step-1 is ensured then proceed to step-2.
2	**Pneumatic testing**	Final pneumatic testing at 6.2kg/cm2 of all PE network to be charged and the same pressure will be held up for at least 4-6 hrs. Ensure no leak is observed throughout the network to be charged. If step-2 is ensured then proceed to step-3.
3	**Purging procedure**	Purging will be done with the help of Nitrogen medium of99.96% purity. Proper vent to be provided at specified safe location. If step-3 is ensured then proceed to step-4.
4	**Gas charging**	1. Ensure all the PE valve on the network to be charged is in closed position. 2. DRS outlet valve to be open and pressure point to be set at 2kg/cm2. 3. Valve of 125 mm main line will be plugged in / open position. Now the pressure will be checked at the tail end of the main pipeline with the help of pressure gauge and reducing arrangement made at the tail end. 4. If all is ok then valve of 63mm secondary line will be plugged in/open position and ensured that there is no any pressure drop on the gauge of the main line. 5. If all is ok then valve of 32mm tertiary/service line will be plugged in/open position and ensured that there is no any pressure drop on the gauge of the main line and gauge of the tertiary line at different locations.

CHARGING PHILOSOPHY IN DETAIL

1. Intent

It is intended to apply this guideline for the purpose of safe purging, commissioning and de-commissioning of City or Local Natural Gas Distribution Network, which has been constructed and tested confirming to specifications laid down in the PNGRB Technical Standards for CGD Networks (T4S).

2. Pre-Commissioning checks

Prior to commissioning, the entire pipeline system shall be checked with respect to the “as built drawings” and other design specifications.

The pre-commissioning checks should include, but not limited to, following, namely:-

(a) Tightness test- The tightness test (pneumatic) should be completed at a pressure of at least 2 bar(g) with air after completion of all mechanical activities including pneumatic test, cleaning and flushing process. For low pressure network tightness test should be done at least at operating / working pressure. Once the pipeline is connected with live line for purging/ gas-in, it should be commissioned immediately and completed as a continuous process.

(b) Function-test of field equipment and system- The supports, route markers, valves, instruments, controls, interlocks etc. are adequately installed and physically checked along the pipeline. All the valves / equipments are checked for intended applications by simulating the operation condition before the gas is introduced to ensure that each valve is operating correctly.

The pipeline and allied systems, including safety systems shall be fully function-tested. The pressure and temperature gauges shall be calibrated prior to use before installation.

(c) Survey of the pipeline- A detailed survey (preferably through line walk) of the pipeline route shall be carried out to confirm that no leakage is observed along the pipeline alignment and at the associated equipment& installations and also to ensure that proper fittings / supports, route markers etc. have been installed along the network. Ensure all points other than purging & venting are in closed condition.

(d) Purging in the Pipeline- The entire primary network, which is ready and proposed for commissioning, shall be purged with air or Inert Gas at positive pressure of not less than 2 bar(g). Reading of Pressure Gauge installed at each Inlet point, Exit point and other specific points shall be noted in a specified format.

Displacement method to be adopted for purging activity. Purging stack, Flame-trap and purging adapter to be arranged at site.

(e) Checking of Communication System- Availability of proper communication system should be checked and confirmed to the Commissioning In-charge.

3. Safety Clearance-

Before start of commissioning works, the Safety Officer of CGD entity shall carry out a Safety clearance, the relevant details of which shall be recorded on the Safety Checklist in accordance with the Technical & Safety Guidelines as per Technical standards.
They shall verify that:

a) All Commissioning personnel have been made aware of the safety hazards of the operations to be undertaken.
b) Procedures & Documents including those for possible emergencies shall be developed and followed.
c) Communications are working satisfactorily.

4. Safety Measures-

Adequate no. of Safety gadgets, personal protective equipments, emergency handling facilities, sign boards, do and don'ts etc as required in the commissioning document should be positioned and available at designated place before start of commissioning activities. A minimum of following shall be ensured at all purging sites.

a) A minimum of 2 dry powder type extinguishers (5 kg) should be available on all purging /venting sites.
b) Smoking, naked light or other sources of ignition should be prohibited. Warning signage/ pictograms like "NO SMOKING" and "NO NAKED LIGHTS" should be prominently displayed around the work site, including at vent points.
c) Electrical continuity bonds (copper) need to be fitted across separated metallic pipes prior to purging operation.
d) Adequate hearing protection should be available, where required.
e) It should be emphasized that purged gas other than air is potentially dangerous leading to asphyxiation and information to prevent asphyxiation should be provided in procedure.

5. Responsibilities during the commissioning operations-

The CGD entity authorized for a GA shall have the overall responsibility for the implementation, record and control of all procedures, forms & formats contained in this Technical Document. The Commissioning In-charge along with the team of Supervisors/Technicians, involved in the Main Line (ML) network commissioning shall have the direct responsibility for following all the procedure(s) and generating all the records as per the formats prescribed in this Technical Document.

GAIL_Internal

6. Commissioning Process-

As a part of procedure, the entity should ensure specific checklist prior to pipeline commissioning based on type of purging method adopted by them i.e. complete displacement as discussed here-in. However, illustrative check lists are annexed to this guideline for reference.

(a) Valves are checked for respective opening / closing positions.
(b) Check Line Pressure.
(c) Nitrogen flow rate shall be controlled by opening / closing the inlet purging valve.
(d) Record the line pressure at every 30 minutes interval.
(e) Ensure Positive Pressure (not less than 2 kg/cm2) for Nitrogen Purging in the entire Pipeline.
(f) After ensuring the nitrogen purging, close purging valve.
(g) Remove the Nitrogen Purging Connection and install a Blind / Plug and Close the Valve.
(h) Gas-in to be started after confirmation of readiness at all valve stations with closed valves in closed position.
(i) Gas Inlet valve to be opened for 50 angle (crack open) and simultaneously nitrogen shall be vented. With further valve opening, Pipeline shall be pressurized up to 4 kg/cm2. Gas availability shall be ensured at this point by LEL / Methane detector and shall be communicated back to DRS station.
(j) Subsequently, each section of Pipeline shall be pressurized so that entire ML network is free from Nitrogen and is pressurized with Natural Gas at a pressure of 2 kg/cm2 up to end of the pipeline.
(k) Hold the pressure of 4 kg/cm2 for a minimum of 04 hour and check the entire ML network for No Leakage.
(l) If any leakage is observed, it shall be recorded and arrested properly.

7. Commissioning Records-

The commissioning records should as a minimum include, but not limited to, following, namely: -

a) Pneumatic test report.
b) Functional-testing of pipeline.
c) Completed pre-start checklist.
d) Purging report.
e) Commissioning report.
f) As-built Drawings.

Remarks If any:		
SIG: NAME: **CONTRACTOR**	SIG: NAME: **PMC**	SIG: NAME: **M/s GAIL(I) PROJECT / (O & M)**

Contrcator's Logo

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COMMISSIONING REPORT
(P.E. LINE)
BR/WP/003

Client	M/S GAIL(I)	**Area Name:**	
Consultant Name		**Locality Name**	
CONTRACTOR			

Details :

1	Length of the Pipe :		5	Date of commissioning :	
2	Size of Pipe:		6	Number of nitrogen cylinders consumed:	
3	Purging Medium:	Nitrogen	7	Line Pr. after gas charging:	
4	Date of Pneumatic testing :				

Check List:

1	Isolation valve plugged	Yes / No /NA	7	Fire Extinguisher / Gas Detector	Yes / No
2	Any Exposed Pipe	Yes / No	8	Sleeves / half round filled with sand	Yes / No/NA
3	RCC/Plate/Pole Markers installation	Yes / No	9	Valve Chamber construction done	Yes / No/NA
4	Charging Tools avaliable	Yes / No	10	Safety equipment /First Aid available	Yes / No
5	As-built Drawing	Yes / No	11	Emergency Nos.provided to the society	Yes / No / NA
6	Certificates confirming nitrogen available	Yes / No			

Contractor **CONSULTANT** **GAIL(I)**

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Fusion welding Checklist

Ref. No.:

Project: CITY GAS DISTRIBUTION PROJECT

Dia. Of Pipe_____Loop No. _____Joint no._____

Coupler Type_____

Project : CITY GAS DISTRIBUTION

Client : M/s GAIL(I)

PMC :

Contractor :

Location :

Joining Details:

Sr. No.	Description	Requirement	Remarks
1	Fusion Machine	Bar coded electro-fusion machine (Automatically Readable)	
2	Whether Fusion Machine verification format available		
3	Coupler Type		
4	Whether material inspection report available		
5	Whether Pipeline is free from dust, water, mud etc.		
6	Whether Alignment Clamp available		
7	Whether approved pipe cutting tool available		
8	Availability of DG set		
9	Whether Jointer is having ID card signed by GAIL(I)/Consultant		
10	Whether Removal of oxidized surface (0.1 to 0.4 mm from outer surface of PE pipe)		
11	Whether Pipes Securely fasten		

Contractor's Logo

Fusion welding Checklist

Ref. No.:

Project: CITY GAS DISTRIBUTION PROJECT

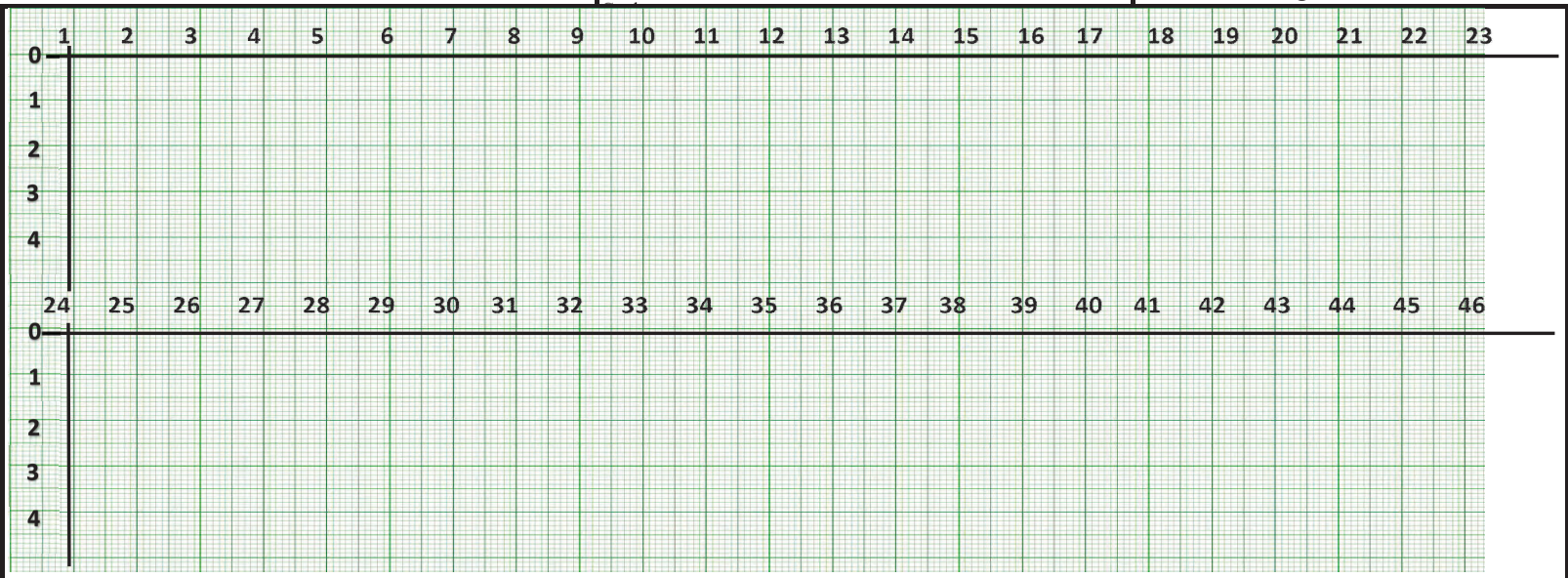
12	Whether Pipes Faces are parallel & aligned through proper alignment clamp		
13	Whether bar code reading done		
14	Fusion completed as per required time through automatic bar code reading		
15	Joint hold immobile under fusion force for 5 minutes		
16	Avoided of any activity near or on joint for 30 minutes		
17	GPS coordinates for joint/joint no. with location		

Contractor	Consultant/GAIL(I)

CGD PE REPORT

Vendor Name			LOA NO : ------- Dated : --------		**Date**
MachineNo/Name		Shot Length (M)	Site Location	LinkName:	Report No.-------
No.ofDuct		DuctLength (M)			
EntryPitGPS Cord.	Latitude/Longitude		ExitPitGPS	Latitude/Longitude	

Rod	Pitch	Depth	Rod	Pitch	Depth
1			26		
2			27		
3			28		
4			29		
5			30		
6			31		
7			32		
8			33		
9			34		
10			35		
11			36		
12			37		
13			38		
14			39		
15			40		
16			41		
17			42		
18			43		
19			44		
20			45		
21			46		
22			47		
23			48		
24			49		
25					



Rod Length (M) =3 M SCALE : X axis = 1CM = 3M SCALE : Y axis = 1CM = 1M

OFFSETDRAWING

	Contractor	Consultant	GAIL(I)
Signature			
Date			

GAIL_Internal

GAIL_Internal

Standard Work Procedure (SWP) PE Laying

Specification of PE Pipes

1	PE Pipes as per IS code- 14885
2	Grade: PE 100 SDR 11

3

PE Carrier Pipe Size (mm)	Thickness (mm)	Length m	HDPE Casing Pipes Min. Dia (mm)	HDPE Casing Pipes Max. Dia (mm)
20	3	200	50	50
32	3	150	50	90
63	5.8	100	110	160
125	11.4	50	200	250
180	16.4	12	250	315

ROUTE SURVEY

1	PE Route for assigned area shall be finalized by PMC/EIC and accordingly sketch will be prepared by contractor.
2	Sketch prepared by contractor to be approved by PMC/ EIC and same shall be used for laying of PE network.
3	Sketch shall have following information/data:-
a.	Total route length
b.	Type of Method for laying like Open cut, HDD or Moling
c.	sizing detail
d.	Break-up of Katcha and Pakka Road

TRENCHING

DEPTH OF TRENCH

1	Minor water body crossing/Canal	2.5 meter
2	Uncased/Cased Road Crossing	1.5 meter
3	Rail/Road Cased Crossing	1.5 meter
4	Normal Areas	1.5 meter

Minimum depths may change depending on requirement of approving authority.

CLEARANCES

1	**150 mm** Where the gas pipe Crosses other assets/utilities
2	**300 mm** Where the gas pipe Crosses (or along) Electical Cable
3	**300 mm** Where the gas pipe is laid along other assets /utilities

TF PROTECTION

1	GI sleeve IS 1239 (Heavy Duty) L 300 mm x Dia. 2.5 inch (3-inch dia. in case of commercial connections)
2	Making of Pedestal (PCC pedestal of grade (1:2:4) and size (300mm(L)X200mm(W) X Height (H)), (H>=300mm & will be as per site condition)))
3	Half round concrete sleeve (min size 250 x 250 x 150 mm)
4	Material **M-20 1:2:4**
5	T F Pits Will be must restored as per site condition.

PE WARNING MAT

1	Specification of Warning mat shall be as per Approved QAP.
2	Warning Mat is to be placed after pedding of about **300 mm** on the top of carrier pipes.

PE Laying

1	The contractor shall ensure that written permission from the concerned authorities is obtained before commencement of PE laying work.
2	All the machinery & adequete manpower should be availiable at site (by contractor) before commencing of the job. Extent of mobilisation is to be finalised by EIC as per availability of work front.
3	Safety measure like Sign board, berricading ,PPE is to be taken up as specified in Technical Specification during PE laying.
4	After PE laying, jointing & before backfilling ,top cover of PE pipe is to witnessed by EIC/PMC.

Flushing

1	Flushing of PE network is to be done by Air from 4-6 kg/cm^2 pressure.
2	Proper flushing is to be ensured before testing.

Testing

1	PE network is to be tested by Air at 6.2 Kg/cm^2 pressure.
2	Pressure is to be hold for the duration as given below:-
a.	PE Length <=500 M ,4 hours.
b.	PE Length >=500 M ,24 hours.

Purging

1	Purging is to be done using Nitrogen at 2 kg/cm^2 presure.
2	Pressure Holding is to be ensured by contractor till gas charging.

Commssioning

1	Before Gas charging in PE network following points are to be complied:
a.	Completeness of valve chamber along with valves.
b.	installation of Pole, and RCC marker.
c.	As built drawing
d.	Also refer Annexure-1

VALVE SIZE

	Dia	Length	Valve Chamber Size
1	180 mm	650 mm	As per tender
2	125 mm	600 mm	
3	63 mm	450 mm	
4	32 mm	300 mm	

Note:-

1 This Procedure is to be read along with PNGRB and T4S Guidelines.

Prepeared by **Checked by** **Approved by**

Contractor's Logo	
Ref. No.:	***PNEUMATIC TESTING REPORT PE Line*** Project: CITY GAS DISTRIBUTION PROJECT

Project: City Gas Distribution at Dakshin Kannada
Client: M/s GAIL(I)
Consultant:
Contractor: Location:

Details :-

1	Size of PE Pipe :	6	Holding Time:
2	Total Length of the pipe:	7	Pressure Gauge Make & No.:
3	Testing Medium: Compressed air (oil free):	8	Gauge calibration valid upto:
4	Testing Pressure:	9	Result:
5	Start Date:	10	Line Pr. after release :

Observation Chart:

S.No.	Time	Reading (Kg.f/cm²)	S.No.	Time	Reading (Kg.f/cm²)
1.			13.		
2.			14.		
3.			15.		
4.			16.		
5.			17.		
6.			18.		
7.			19.		
8.			20.		
9.			21.		
10.			22.		
11.			23.		
12.			24.		

Contractor's Logo	
Ref. No.:	***PNEUMATIC TESTING REPORT PE Line*** Project: CITY GAS DISTRIBUTION PROJECT

Check List :-

Flushing
Pipe cleared from water & debris: - Yes/ No

Witnessed by :

1. GI Sleeves/ Half round concrete sleeve properly installed : - Yes/ No
2. Isolation Valve plugged: - Yes/ No
3. Regulator piece properly clamped: - Yes/ No
4. Sand filling in GI/ Half round concrete sleeve and non exposure of PE pipe/ Transition fitting – Yes/ No
5. Isolation Valve in open condition with open end plugged- Yes/ No

Contractor	**Consultant**	

STANDARD WORK PROCEDURE FOR PE LAYING AND GI WORKS

Project: City Gas Distribution Projects

Client: M/s GAIL(I)

Consultant:

Contractor:

Date: -

Standard Work Procedure (SWP) For PE Laying

Specification of PE Pipes

1	PE Pipes as per IS code- 14885
2	Grade: PE 100 SDR 11

3

PE Carrier Pipe Size (mm)	Thickness (mm)	Length m	HDPE Casing Pipes Min. Dia (mm)	HDPE Casing Pipes Max. Dia (mm)
20	3	200	50	50
32	3	150	50	90
63	5.8	100	110	160
125	11.4	50	200	250
180	16.4	12	250	315

ROUTE SURVEY

1	PE Route for assigned area shall be finalized by PMC/EIC and accordingly sketch will be prepared by contractor.
2	Sketch prepared by contractor to be approved by PMC/ EIC and same shall be used for laying of PE network.
3	Sketch shall have following information/data:-
a.	Total route length
b.	Type of Method for PE laying like Open cut, HDD or Moling.
c.	Sizing detail
d.	Break-up of Katcha and Pakka Road

TRENCHING

DEPTH OF TRENCH

1	Minor water body crossing/Canal	2.5 meter
2	Uncased/Cased Road Crossing	1.5 meter
3	Rail/Road Cased Crossing	1.5 meter
4	Normal Areas	1.5 meter

Minimum depths may change depending on requirement of approving authority.

CLEARANCES

1	**150 mm** Where the gas pipe Crosses other assets/utilities
2	**300 mm** Where the gas pipe Crosses (or along) Electrical Cable
3	**300 mm** Where the gas pipe is laid along other assets /utilities

TF PROTECTION

1	GI sleeve **IS 1239 (**Heavy Duty) L 300 mm x Dia. **2.5 inch** (3-inch dia. in case of commercial connections)
2	Making of Pedestal (PCC pedestal of grade (1:2:4) and size (300mm(L)X200mm(W) X Height (H)), (H>=300mm & will be as per site condition)))
3	Half round concrete sleeve (As per tender)
4	Material **M-20 1:2:4**
5	T F Pits Will be must restored as per site condition.

PE WARNING MAT

1	Specification of Warning mat shall be as per Approved QAP.
2	Warning Mat is to be placed after padding of about **300 mm** on the top of carrier pipes.

PE Laying

1	The contractor shall ensure that written permission from the concerned authorities is obtained before commencement of PE laying work.
2	All the machinery & adequate manpower should be available at site (by contractor) before commencing of the job. Extent of mobilization is to be finalized by EIC as per availability of work front.
3	Safety measure like Sign board, barricading, PE is to be taken up as specified in Technical Specification during PE laying.
4	After PE laying, jointing & before backfilling, top cover of PE pipe is to be witnessed by EIC/PMC.

Flushing

1	Flushing of PE network is to be done by Air from 4-6 kg/cm^2 pressure.
2	Proper flushing is to be ensured before testing.

Testing

1	PE network is to be tested by Air at 6.2 Kg/cm^2 pressure.
2	Pressure is to be hold for the duration as given below: -
a.	PE Length <=500 M, 4 hours.
b.	PE Length >=500 M, 24 hours.

Purging

1	Purging is to be done using Nitrogen at 2 kg/cm^2 pressure.

2	Pressure Holding is to be ensured by contractor till gas charging.

Commissioning

1	Before Gas charging in PE network following points are to be complied:
a.	Completeness of valve chamber along with valves.
b.	Installation of Pole, and RCC marker.
c.	As built drawing
d.	Also refer Annexure-1

VALVE SIZE

	Dia	Length	Valve Chamber Size
1	180 mm	650 mm	1000 (L)X1000 (W)
2	125 mm	600 mm	1000 (L)X1000 (W)
3	90 mm		1000 (L)X1000 (W)
4	63 mm	450 mm	600 (L)X600 (W)
5	32 mm	300 mm	600 (L)X600 (W)

Note:-

1 **This Procedure is to be read along with PNGRB and T4S Guidelines.**

Prepared by **Checked by** **Approved by**

Contractor's Logo

VALVE CHAMBER CONSTRUCTION CHECKLIST /POUR CARD

Ref. No.:

Project: CITY GAS DISTRIBUTION PROJECT,_____

Report no: _____

Project	:	CITY GAS DISTRIBUTION,_____	
Client :		M/s GAIL(I)	
PMC	:		
Contractor	:	----------	
Location	:	----------	
Dia of Pipe	:	----------	Dia of Valve:
Type of Valve chamber	:	----------	Size of Valve chamber:
Date:-	:		

Valve Chamber Details

Sr. No.	Description	Requirement	Witnessed by
1.	Excavation of Pit	As per Drawing/tender requirement	
2.	Inspection of contractor supplied materials	Sand, Corse Sand, Cement, Steel Bar, Concrete	
3.	Concrete Grade		
a)	Aggregate Size	20 MM & Down	
b)	Sand	Coarse sand of approved quality	
c)	Cement	Reputed manufacturer	
4.	Reinforcement Rods	As per Drawing/tender requirement	
5.	Manhole cover	As per tender drawing	
6.	Laying of PCC for foundation (Casting of 100 mm thick PCC for foundation, M10 Grade)	As per Drawing/tender requirement	
7.	Curing of base PCC	At proper interval	
8.	Inspection of Shuttering, Spacing and Dimension of walls	As per Drawing/tender requirement	
9.	Laying of RCC on top of PCC (Casting of 150mm thick RCC on top of PCC (M-25))	As per Drawing/tender requirement	

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VALVE CHAMBER CONSTRUCTION CHECKLIST /POUR CARD

Ref. No.:

Project: CITY GAS DISTRIBUTION PROJECT,_____

10.	Concrete casting of pedestal to support of Valve	As per Drawing/tender requirement	
11.	Fabrication of reinforcement along with angle insert as per drawing for wall	As per Drawing/tender requirement	
12.	Spacing of reinforcement between shuttering	Proper in between and as per Drawing/tender requirement	
13.	Casting of 150mm thick RCC for walls (M-25)	RCC M-25	
14.	Curing of casting (walls) along with base PCC/RCC	At proper interval	
15.	Fabrication of reinforcement as per drawing for top cover	Not Require	
16.	Centering, Shuttering, Spacing and Dimension of top Cover	Not Require	
17.	Casting of top RCC	As per Drawing/tender requirement	
18.	Curing of top cover RCC	As per standard	
19.	Plastering of wall with Cement Mortal with water Proofing (16 mm thk)	As per Drawing/tender requirement	
20.	Coping and sealing of entry and exit of pipe in the chamber	As per drawing	
21.	Sand filling	Coarse sand of approved quality	
22.	Supply and placement of Manhole cover	Heavy duty (with lifting hook) and proper placement	

Contractor	Consultant/GAIL(I)

GAIL_Internal

SCOPE OF WORK & TECHNICAL SPECIFICATIONS FOR MAINTAINANCE FREE CHEMICAL EARTH PIT

Supply, installation and Commissioning of maintenance free earth pits as per the specifications mentioned in this tender document

(a) Destruction of PCC (if any).
(b) Excavation & removal of soft/ hard/ rocky area up to 3mtr depth.
(c) Installation of new electrode along with earth enhancing material and backfill material.
(d) Termination of GI strips.
(e) Construction of earth pits chamber of Size when measure from inside of chamber shall be 450mmX450mm. Good quality of bricks and PCC (1:4) to be used for construction of the chamber. Painting of Earth pit Chamber is also in the scope of Contractor.
(f) GI cover of 6 mm thickness and appropriate size for chambers with one coat of primer and two coat of paint on both side to be provided. Numbering of Earth Pit & Resistance value, Due date etc. to be written on Cover Plate. The Cover shall have provision of hand lifting arrangement.
(g) Restoration of PCC excluding earth pit.
(h) Any other consumables/ materials/ resources required to complete the job in totality shall be in the scope of bidder.

SPECIFICATIONS OF MAINTENANCE FREE EARTH PIT:

1) Ground electrode/ Earth Electrode:

a) Salient features of Solid rod earth electrode:

1. High tensile-low carbon steel rod complying with requirements of BS 4360, Grade 43 A, molecularly bonded by 99.99% pure high conductivity copper on outer surface with copper coating thickness 250 micron or more.
2. Earth rods shall be copper bonded steel ground rods especially designed for electrical grounding.
3. Earth rods shall be corrosion resistant while providing the lowest possible resistance to ground.
4. The Ground electrode shall be 3/4” diameter X 10 feet long Copper bonded steel rods, especially designed for electrical grounding.
5. Copper bus bar of size 250 mm x 50mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall be exothermically welded to rod with 4 holes of 12 mm dia. (2 on each side) for connecting earthing conductor.
6. Identification: Company name, length, diameter and other specifications must be roll stamped at the end of each rod and shall be visible when buried.

b) Technical specifications for solid rod earth electrode:

Material: Copper & Low carbon steel
Length: 10 feet
Diameter: ¾ inch
Certification: UL & CPRI approved.
Copper coating thickness: Not less than 250 microns.
Recommended standards: IEEE Std. 142-1991 (Clause No. 4.3.1) IEEE Std. 80-2000 (Clause No. 11.2.2)
IS: 3043-1987 (Clause No. 9.2.2)

2) Earth enhancement material:

Earth enhancement material is a superior conductive material that improves earthing effectiveness, especially in areas of poor conductivity (rocky ground, areas of moisture variation, sandy soils etc.). It may contain conductive cement, graphite, hydrous aluminum silicate, sodium montmorillonite etc. and shall not contain bentonite. It improves conductivity of the earth electrode and ground contact area. Earth Enhancement Material in adequate quantity shall be used for reducing earthing resistance & maintaining low resistance permanently. Minimum 50 Kg Earth Enhancement Material should be used for each Earth pit. If more earth enhancing materials are needed to get the desired value i.e. less than 3 Ohm of Pit Resistance, than the required quantity has to be supplied by the party on free of cost.

It shall have following characteristics-

(a) It should have low resistivity preferably bellow 0.2 Ohm-meters.
(b) It shall not depend on the continuous presence of water to maintain its conductivity.
(c) It should be a little alkaline in nature with pH value >7 but <9, test certificate from NABL approved laboratory to be provided for the composition so designed.
(d) It should have better hygroscopic properties to absorb moisture. It should absorb and release the moisture in dry weather condition and help in maintaining the moisture around the earth electrode.

suitable for compacting and after drying the soil may contain voids which may permanently increase earth resistance.

(e) It should have capacity to retain >10% moisture at 105ºC. Test certificate from NABL approved lab to be submitted for the composition so designed.
(f) It should have water solubility < 5%. Test certificate from NABL approved lab be submitted for the composition so designed.
(g) It should be granular with granule size 0.1 mm to 3 mm.
(h) It should be non-toxic, non-reactive, non-explosive & non-corrosive.
(i) It shall be thermally stable between -10 degree centigrade to +60 degree centigrade ambient temperature.
(j) It shall not decompose or leach out with time.
(k) It shall not pollute the soil or local water table and meets environmental friendly requirement for landfill.
(l) It should expand & swell considerably and removes entrapped air to create strong Connection between earth electrode and soil.
(m) It should be diffuses into soil pores and creates conductive roots enlarging conductive zone of earth pit.
(n) It shall be permanent & maintenance free and in its “set form”, maintains constant earth resistance with time.
(o) It shall not require periodic charging treatment or replacement.
(p) It shall be suitable for any kind of electrode and all kinds of soils of different resistivity.

3) Backfill material:

Normally the excavated soil shall be used if it is free from sand, gravel and stones. In case the excavated oil contains sand, gravel and stones these shall be removed by appropriate methods such as hand picking, sieving etc., Small proportion of sand in the soil may be permissible. Material like sand, salt, coke breeze, cinders and ash shall not be used because of its acidic and corrosive nature. If the excavated soil contains sand, gravel and stone in large proportion and it is not feasible to remove these economically, good quality soil from other place may be used for backfilling. While backfilling the soil shall be thoroughly compacted with at least 5 Kg compactor. In case the soil is dry, small quantity of water may make the soil muddy which is not

suitable for compacting and after drying the soil may contain voids which may permanently increase earth resistance.

4) Earth pit chamber/ Inspection chamber:

(a) The Chamber size shall be 450 mm x 450 mm and the chamber wall thickness shall be not less than 130 mm.
(b) The Chamber cover shall be MS plate with dimension 450mm x 450mm x 6mm thickness.
(c) The masonry work shall be white washed inside and outside. Minimum 2nd class bricks and 1:4 ratio of cement & sand to be used for PCC.
(d) Care shall be taken regarding level of the floor surrounding the earth so that the connector is not too deep in the masonry or projecting out of it.
(e) 65mm diameter PVC conduits should be provide at two opposite side of the chamber wall for 75x4mm GI tape connection to earth bus bar of ground electrode.

5) GI strip (:

(a) The zinc coating of GI flat shall be as per IS: 6745. The zinc coating thickness of GI strip shall be not less than 80 microns. The test certificate from any NABL accredited lab must be submitted.
(b) In some area Earth strip may be laid in open trenches, cable trays, and steel structure as per site requirement.
(c) The earth strip if laid over the steel structure shall be firmly cleated to the structure. The earth strip shall be protected against mechanical damage.
(d) Joints and tapings in the main earth loop shall be made in such a way that reliable and good electrical connections are permanently ensured. All joints below ground shall be welded and suitable protected by giving two coats of bitumen and covering with hessian tape. All joints above ground shall be by means of connectors/ lugs as far as practicable.

6) Tests:

(a) The copper coating shall not be less than the prescribed thickness at any point. Test certificate along with warranty certificate must be provided for each Electrode.
(b) Material composition of rod shall be tested as per standard BS: 4360.
(c) Corrosion Test: As per IS: 2119, salt spray test for analysis of the specific electrode shall be done, preferably for 500 hrs or more.
(d) Physical, chemical and electrical properties tests on earth enhancement material as per clause no. 3.1.
(e) Toxic content tests for cadmium, lead, mercury, hexavalent chromium, Polybrominated biphenyl's (PBBs) & polybrominated diphenyl ethers.

(f) (PBDEs) on earth enhancement material.

Test Certificate from any NABL accredited Lab must be submitted by vendor During execution of job.

7) Acceptance test:

Following shall constitute acceptance tests and shall be done on 100% sample basis for all tests mentioned below except where otherwise indicated.

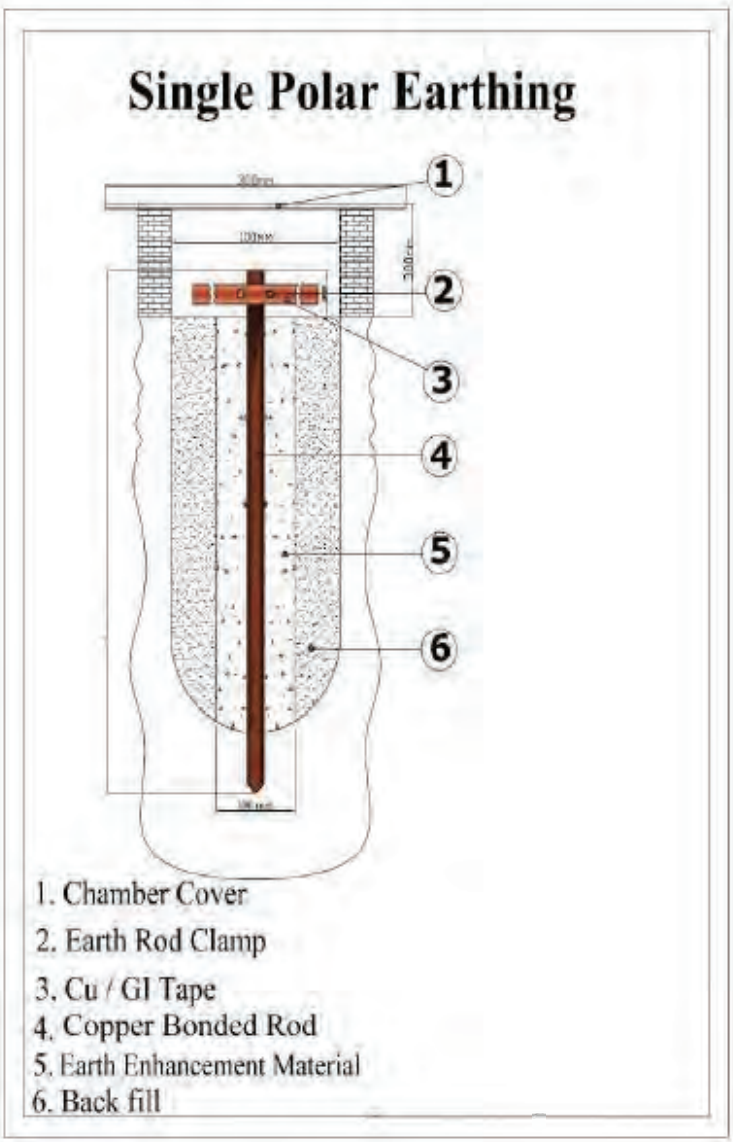
(a) Physical check for earth electrode as per clause no. 1 (a) & (b) for rod type electrode.

(b) Dimensional and construction feature tests of inspection chamber as per clause no. 4.0.

(c) Earth enhancement material as per clause no. 2.

(d) Earth resistance measurements as per Para 37 of IS: 3043

Drawing of EARTH PIT:



GAIL_Internal

Checklist for CMC/GAIL: Construction and Commissioning of CGD Facilities

Geographical Area:
Pipeline Section & Area:

SN	Stipulations	Remarks
MDPE Pipelines		
1.	Standards and specifications of HDPE Pipes and Fittings (Refer Annexure 1- List of Specifications of Piping Materials used in CGD Network): 1. MDPE Pipe 2. Flange 3. Valve 4. Stud Bolts & Nuts 5. Fittings	List down the Code(s) wrt Specifications
2.	Specify Grade and Colour of Pipeline (s)	.
3.	Minimum wall thickness of Pipeline(s)	
4.	Length of the Pipeline(s)	….. Meters
5.	Verify Electro-fusion fittings used for all sizes of PE pipes complying with ISO 8085 Part 3 / EN-1555 -3	Yes/No
6.	Verify each Electro Fusion fitting be bar coded.	Yes/No
7.	Provision of Fusion fittings having permanent fusion indicator or a data card conforming to ISO-7810/ISO- 7811.	Yes/No
8.	Ensure that the fusion jointing carried out as per the procedure outlined in the standard DVS 2202 or equivalent. Procedure for hot taps installations is in place	Yes/No Yes/No
9.	Provision of more or equal wall thickness of the fittings than wall thickness of the pipe jointed.	Yes/No
10.	Provision of minimum depth of cover for buried HDPE pipelines in line T4S Regulations	…… Meters
11.	Nos. of locations where deviation from minimum depth cover observed.	….. Nos. Protective Measures should be documented.
12.	Provision of mains valve spacing kept plastic distribution	…. KM
13.	Nos. of Valves in Pipeline(s)	…Nos.
14.	Ensure underground Valve Pit is accessible for Cleaning and Closure.	Yes/No
15.	Water filled or Seepage of Valve	Yes/No
16.	Hydro/Pneumatic testing, cleaning of pipeline as per tender specification and standards	Yes/No
17.	Test Duration	Yes/No

Checklist for CMC/GAIL: Construction and Commissioning of CGD Facilities

18.	Nos. of Pipeline Markers (Provision of Markers along entire network as per Tender Document) Provision of additional warning signs or markers installed to indicate the presence of a pipeline at road, highway, railroad, stream, canal, nala crossings and other locations where there is a possibility of damage or interference)	…… Nos. Yes/No, …… Nos.
19.	Provision of warning mat	Yes/No
20.	A marker be marked in bold and legible local language and Hindi / English with at least the following: • Name of CGD Network Operating Company • Contact Telephone Number to report emergency • Location Area Code • Warning - "High Pressure Gas Line, Dial before Digging" etc.	Yes/No
21.	Furnish following records/ documents: • Design Specification • Alignment sheets for primary network of steel pipeline and associated pipe book and other installation and test records • Surveillance inspection and maintenance records • Material certification including dimension, metallurgy, destructive and non-destructive testing records, performance and functional test reports • Commissioning reports • Non-conformance / deviation records • Calibration records of Inspection, Measuring, Metering and test equipment • Audit compliance report • Statutory clearances • Approved drawings /documents • HAZOP / Risk Assessment reports and compliance to recommendations of such reports • **All operation and maintenance manuals made available prior to commissioning** • **Availability of SOPs prior to commissioning**	Yes/No Yes/No Yes/No Yes/No Yes/No Yes/No Yes/No Yes/No Yes/No Yes/No Yes/No Yes/No

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	• **Display of Critical SOPs, if any prior to commissioning**	Yes/No

Remarks: