

Sd/-
Dy.Ch.E.(SP)P&D

Sd/-
Ch.E.(SP.)



E-TENDER

FOR

Name of Work : P/L 400 mm dia. (OD) HDPE pipe sewer line (PN-6 Class- PE 80 grade : IS 14333) to correct grade and alignment on North side of JVLR from W.E.H. to Pratap Nagar, Jogeshwari(E) in K/E Ward by HDD method

BID DOCUMENT

Website: portal.mcgm.gov.in/tenders

Office of: Dy.Chief Engineer (Sewerage Project),
P&D2nd Floor, Engineering Hub Building,
Dr. E.MosesRoad,Worli Naka,
Worli,Mumbai- 400 018.

INDEX

SECTION	DESCRIPTION	PG-NO
1	E-TENDER NOTICE	3 - 7
2	ELIGIBILITY CRITERIA	8 - 11
3	DISCLAIMER	12 - 14
4	INTRODUCTION	15 - 16
5	E-TENDER ONLINE SUBMISSION PROCESS	17 - 20
6	INSTRUCTIONS TO APPLICANTS	21 – 58
7	SCOPE OF WORK	59 – 62
8	BILL OF QUANTITIES	63 – 70
9	GENERAL CONDITIONS OF CONTRACT	78 – 129
10	SPECIFICATIONS AND SELECTION OF MATERIAL	130 – 132
11	FRAUD AND CORRUPT PRACTICES	133 - 136
12	LIST OF APPROVED BANKS	137 – 144
13	APPENDIX	145 – 273
14	SPECIAL DIRECTION TO THE TENDERER	274 – 391
15	DRAWINGS	392 – 394

SECTION - 1
E-TENDER NOTICE

BRIHANMUMBAI MUNICIPAL CORPORATION

Dy.Ch.E./ SP/ 5791/P&D/e-Tender no.17 /Notice No. 16 , 2022-23 dated 17.10.2022

Percentage Rate Tender

E-TENDER NOTICE

Subject: P/L 400 mm dia. (OD) HDPE pipe sewer line (PN-6 Class- PE 80 grade : IS 14333) to correct grade and alignment on North side of JVLR from W.E.H. to Pratap Nagar, Jogeshwari(E) in K/E Ward by HDD method.

The Municipal Corporation (BMC) invites e-tender (% basis) to appoint Contractor for the aforementioned work from contractors of repute, multidisciplinary engineering organizations i.e. eminent firm, Proprietary/Partnership Firms/ Private Limited Companies/ Public Limited Companies/Companies registered under the Indian companies' act 2013, the contractors registered with the Municipal Corporation of Greater Mumbai, (BMC) **Class II and above as per new registration** (excluding those who are blacklisted or against whom F.I.R. has been filed) or those having equivalent or more work experienced from Central or State Government/Semi Govt. Organization/Central or State Public Sector Undertakings, will be allowed subject to condition that, the contractors who are not registered with BMC shall apply for registration with BMC (in same class equivalent to BMC) within three months from the date of issue of work order, otherwise their Bid Security i.e. E.M.D (Earnest Money Deposit) will be forfeited/recovered and an amount equal to Registration Fee of respective class will be recovered as penalty.

Bidding Process will comprise of THREE stages.

The application form can be downloaded from BMC's portal (<http://portal.mcgm.gov.in>) on payment of Rs. 10,400+ 18% GST applicable. The applicants not registered with BMC are mandated to get registered (Vendor Registration) with BMC for e-tendering process & obtain login credentials to participate in the online bidding process.

i) To download the application form, for those applicants not having vendor registration, need to apply first for vendor registration at the office of Account Officer (FAR), 4th floor, Municipal Headquarter.

ii) Followed by SRM login ID and password to be obtained from Central Purchase Department (CPD), Office at Byculla, Bakariadda, Mumbai

iii) For e-Tendering registration, enrollment for digital signature certificates and user manual, please refer to respective links provided in 'Tenders' tab. Vendors can get digital signature from any one of the Certifying Authorities (CA's) licensed by controller of certifying authorities namely, Safes crypt, IDRBT, National informatics center, TCS, CUSTOMS, MTNL, GNFC and e- Mudhra CA.

Sr. No.	Name of work	Bid Invitation No.	Estimated Cost in Rs.	Contract Period	E.M.D. in Rs.	Cost of e-Tender Rs.
1.	P/L 400 mm dia. (OD) HDPE pipe sewer line (PN-6 Class- PE 80 grade : IS 14333) to correct grade and alignment on North side of JVLR from W.E.H. to Pratap Nagar, Jogeshwari(E) in K/E Ward by HDD method	7200037830	4,31,52,100/-	11 Months (Excluding Monsoon)	4,31,600/-	Rs.10,400/- + 18% GST as Applicable

In terms of the 3 stage system of e-tendering, a Bidder will be required to deposit, along with its Bid, an Earnest Money Deposit of Rs. **4,31,600/- (Four Lakhs Thirty One Thousand Six Hundred only)** (the "EMD"), refundable in accordance to the relevant clause of bid document, from the Bid Due Date, except in the case of the selected Bidder whose Bid Security/EMD shall be retained. The Bidders will have to provide Earnest Money Deposit through the payment gateways while submitting the bids. The Bid shall be summarily rejected if it is not accompanied by the Earnest Money Deposit. The e-tender is available on BMC portal (<http://portal.mcgm.gov.in>) as mentioned in the Header Data of the tender.

As per THREE Packet systems, the document for Packet A & B is to be uploaded by the bidder in vendors' document online in Packet A, B. Packet A,B & C shall be opened on dates as mentioned in header data. All the responsive and eligible bidders if they so wish can be present at the time of opening of bids, in the office of Dy. Chief Engineer (Sewerage Project) P&D. The Packet C shall be opened if bids submission in Packet A & B satisfies/includes all the requirements and same are found acceptable to the Authority.

The Municipal Commissioner reserves the right to reject all or any of the e- tender(s) without assigning any reasons at any stage.

The dates and time for submission and opening the bids are as shown in the Header Data. If there are any changes in the dates the same will be displayed on the BMC Portal. (<http://portal.mcgm.gov.in>)

The Applicants interested for the above referred works may contact the Dy. Chief Engineer (Sewerage Project) P&D.. at the following address on any working day during office hours.

Office of: Dy.Chief Engineer (Sewerage Project)P&D, BMC
Second Floor, Engineering Hub Building,
Dr.E.Moses Road, Worli Naka,
Worli, Mumbai- 400 018.

The applicants may wish to visit the site under reference located at **K/East Ward**, a part of Mumbai and can collect the information of the present status from the department who have invited the bids.

The BMC reserves the rights to accept any of the application or reject any or all the application received for above works, without assigning any reasons thereof. The information regarding above subject matter is available on Website of BMC. (<http://portal.mcgm.gov.in/tenders>)

-sd-

Shri S.S.Kamble
Dy.Ch.Eng. (Sewerage Project)
Planning and Design

HEADER DATA

Tender Document No	7200037830
Name of Organization	Municipal Corporation of Greater Mumbai.
Tender No.	Dy.Ch.E./ SP/ 5791 /P&D/e-Tender no.17 /Notice No. 16 , 2022-23 dated 17.10.2022
Subject	P/L 400 mm dia. (OD) HDPE pipe sewer line (PN-6 Class- PE 80 grade : IS 14333) to correct grade and alignment on North side of JVLR from W.E.H. to Pratap Nagar, Jogeshwari(E) in K/E Ward by HDD method
Cost of Tender	Rs.10,400 + 18% GST as applicable
Cost of E-Tender(Estimated Cost)	Rs. 4,31,52,100/-
Bid Security Deposit/ EMD	Rs. 4,31,600/-
Date of issue and sale of tender	19.10.2022 from 11.00 Hrs..
Last date & time for sale of tender	28.10.2022 till 14.00 Hrs
Submission of Packet A, B & Packet C (Online) & Receipt of Bid Security Deposit	28.10.2022 till 16.00 Hrs
Opening of Packet A	01.11.2022 after 15.00 Hrs
Opening of Packet B	01.11.2022 after 16.00 Hrs
Opening of Packet C	10.11.2022 at 15.00 Hrs
Address for communication	Office of the:- Dy.Chief Engineer (Sewerage Project)P&D, BMC, Second Floor, Engineering Hub Building, Dr.E.Moses Road, Worli Naka, Worli, Mumbai- 400 018
Venue for opening of bid	On line in Dy.Ch. Eng. (Sewerage Project.) P&D's office.

This tender document is not transferable.

The BMC reserves the rights to accept any of the application or reject any or all the application received for above subject without assigning any reason thereof.

Sd/-

Shri S.S.Kamble

Dy.Ch.Eng.(Sewerage Project)

Planning and Design

SECTION - 2
ELIGIBILITY CRITERIA

ELIGIBILITY CRITERIA

1. Eligibility

1.1 Technical Capacity (Project Experience)

The tenderer(s) in their own name should have satisfactorily completed the work of similar nature BMC /Semi Govt. /Govt. & Public Sector Organizations during **last seven (7) years** ending last day of month previous to the one in which bids are invited as a prime Contractor (or as a nominated sub-Contractor, where the subcontract had involved similar nature of work as described in the scope of works in this bid document, provided further that all other qualification criteria are satisfied)

a) **Three completed** works of similar nature each costing **30%** of estimated cost. (i.e.Rs. **1,29,45,630.00**)

Or

b) **Two completed** works of similar nature each costing **40%** of estimated cost. (i.e. Rs. **1,72,60,840.00**)

Or

c) **One completed** work of similar nature each costing **60%** of estimated cost. (i.e. Rs. **2,58,91,260.00**)

The value of completed works shall be brought to current costing level by enhancing the actual value of work at compound rate of 10 % per annum; calculated from the date of completion to last date of receipt of applications for tenders.

In order to meet technical capacity MoU is allowed as per clause 84 (GCC).

1.2 Financial Capacity

a) Bidder must achieved an average annual financial turnover as certified by 'Chartered Accountant' (in all classes of civil engineering construction works only) equal to **30%** of the estimated cost of work (i.e. Rs. **1,29,45,6300.00**) in **last three (3) financial years** immediately preceding the Financial Year in which bids are invited i.e **1st April 2019 to 31st March 2022**

- To ascertain this, tenderer(s) shall furnish /upload the financial statement (Audited balance sheet) duly certified by Chartered Accountant.
- The turnover can be enhanced by 10% every year to bring the present level.

1.3 Similar Experience:

- a) For assessing the technical capacity of bidder, similar work shall mean, the completed works of laying Gravity/rising mains in Sewerage networks or SWD drain network work or H.E. network work.
- b) The bidder shall have similar experience of providing and laying Sewer/Water/Petroleum/Gas line / Telecommunication cables / High Power Cables by HDD (Horizontal Directional Drilling) in extremely hard Rock having hardness factor not less than 6 (Mohs) and 250 Mpa for the minimum length of 200 RM in completed or ongoing project during last 7 years prior to invitation of tender.

OR

They should submit memorandum of understanding (MOU) with a firm and the firm should have laying experience as per the requirement given above either in his own capacity or as an officially approved Sub- contractor. The tenderer has to submit all the credentials of the firm with whom they are entering with MOU.

1.4 Bid Capacity:

The bid capacity of the prospective bidders will be calculated as under:

$$\text{Assessed Available Bid Capacity} = (A * N * 2 - B)$$

Where,

A = Maximum value of Civil Engineering works completed in any one year (year means Financial year) during the last five years (updated to the price level of the Financial year in which bids are received at a rate of 10% per year) taking into account the completed as well as works in progress i.e works completed within **1st April 2017 to 31st March 2022**.

N = **Number of years prescribed for completion of the Project / Works, excluding monsoon period, for which these bids are being invited. (E.g. 7 months = 7/12 year)**
For every intervening monsoon 0.33 shall be added to N.

B = Value of existing commitments (only allotted works) on the last date of submission of bids as per bidding document and on-going works to be completed during the period of completion of the Project/Works for which these bids are being invited.

Note: The statement showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be attached

along with certificates duly signed by the Engineer-in Charge, not below the rank of an Executive Engineer or equivalent.

Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- made misleading or false representation in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- Record for poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, or financial failures etc.

SECTION - 3
DISCLAIMER

DISCLAIMER

The information contained in this e-tender document or provided to Applicant(s), whether verbally or in documentary or any other form, by or on behalf of the Municipal Corporation of Greater Mumbai (BMC), hereafter also referred as “The Authority “, or any of its employees or advisors, is provided to Applicant(s) on the terms and conditions set out in this e-tender and such other terms and conditions subject to which such information is provided.

This e-tender includes statements, which reflect various assumptions and assessments arrived at by the Municipal Corporation of Greater Mumbai (BMC) in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Applicant may require. This e-tender may not be appropriate for all persons, and it is not possible for the Municipal Corporation of Greater Mumbai (BMC), its employees or advisors to consider the investment objectives, financial situation and particular needs of each party who reads or uses this e-tender. The assumptions, assessments, statements and information contained in this e-tender may not be complete, accurate, adequate or correct. Each Applicant should therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this e-tender and obtain independent advice from appropriate sources.

Information provided in this e-tender to the Applicant(s) is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The Municipal Corporation of Greater Mumbai (BMC) accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed here.

The Municipal Corporation of Greater Mumbai(BMC), its employees and advisors make no representation or warranty and shall have no liability to any person, including any Applicant or Bidder, under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this e-tender or otherwise, including the accuracy, adequacy, correctness, completeness or reliability of the e-tender and any assessment, assumption, statement or information contained therein or deemed to form part of this e-tender or arising in any way with pre-qualification of Applicants for participation in the Bidding Process.

The Municipal Corporation of Greater Mumbai (BMC) also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Applicant upon the statements contained in this e-tender.

The Municipal Corporation of Greater Mumbai (BMC) may, in its absolute discretion but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this e-tender.

The issue of this e-tender does not imply that the Municipal Corporation of Greater Mumbai (BMC) is bound to select and short-list pre-qualified Applications for Bid Stage or to appoint the selected Bidder or Concessionaire, as the case may be, for the Project and the Municipal Corporation of Greater Mumbai (BMC) reserves the right to reject all or any of the Applications or Bids without assigning any reasons whatsoever.

The Applicant shall bear all its costs associated with or relating to the preparation and submission of its Application including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by The Municipal Corporation of Greater Mumbai (BMC) or any other costs incurred in connection with or relating to its Application. All such costs and expenses will remain with the Applicant and the Municipal Corporation of Greater Mumbai (BMC) shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by an Applicant in preparation or submission of the Application, regardless of the conduct or outcome of the Bidding Process.

SECTION - 4
INTRODUCTION

INTRODUCTION

Background:

The Municipal Corporation of Greater Mumbai covers an area of **437.71sq.kms** with a population of **1.24 Crores as per census of 2011**. The metropolis accounts major portion of India's international trade and government's revenue, from being one of the foremost centers of education, science and technological research and advancement.

The Mumbai Metropolis has historic tradition of strong civic activism dedicated to the cause of a better life for all its citizens. And it's the Municipal Corporation of Greater Mumbai (BMC), hereafter called the "corporation", the primary agency responsible for urban governance in Greater Mumbai.

BMC (The Authority) is one of the largest local self-governments in the Asian Continent. In observance of historic traditions of strong civic activism, with the change in time and living conditions to match with the urbanization, BMC has mainly focused in providing almost all kinds of engineering services viz, Hydraulics, storm water drain, sewerage, water supply projects, roads, bridges, solid waste management, and environmental services. Beside this, the BMC is also providing dedicated services in various segments such as Health, Primary Education as well as the construction and maintenance of Public Markets and Slaughter Houses.

BMC is an organization having different departments, right from engineering depts. to health depts. Moreover we have other dept. like education, market, fire brigade dept. and other such departments where quite a good number of staff members are working.

Scope of Work:

BMC is primarily an organization, which in the interest of citizens and with the speed of urbanization deals with the variety of the infrastructure services and delivered to the public by different departments like Water Supply Projects, Sewerage Projects, Hydraulics, Storm Water Drain/Roads and bridges and Building Construction etc.

(* PROJECT SPECIFIC SCOPE OF WORK IS MENTIONED IN SECTION NO 7)

SECTION - 5
E-TENDERING ONLINE
SUBMISSION PROCESS

E-TENDERING ONLINE SUBMISSION PROCESS

The terminology of e-Tendering is solely depending upon policies in existence, guidelines and methodology adopted since decades. The SRM is only change in process of accepting and evaluation of tenders in addition to manual. The SAP module to be used in this E-tendering is known as Supplier Relationship Module (SRM).SRM is designed and introduced by ABM Knowledge ware Ltd. who will assist BMC in throughout the tendering process for successful implementation.

NOTE: This tendering process is covered under Information Technology ACT & Cyber Laws as applicable

(1) In e-tendering process some of the terms and its definitions are to be read as under wherever it reflects in online tendering process.

Start Date read as “Sale Date”

End Date read as “Submission Date”

Supplier read as “Contractor/bidder”

Vendor read as “Contractor/bidder”

Vendor Quotation read as “Contractors Bid/Offer”

Purchaser read as “Department/BMC”

I. Before entering in to online tendering process, the bidders should complete the registration process so as to get User ID for E-tendering links. For this, the bidders can access through Supplier registration via BMC Portal.

There are two methods for this registration :(II and III)

II. Transfer from R3 (registered contractors with BMC) to SRM

a. Contractors already registered with BMC will approach to Vendor Transfer cell.

b. Submit details such as (name, vendor code, address, registered Email ID, pan card etc.) to Vendor transfer cell.

c. BMC authority for Vendor Transfer, transfers the Vendor to SRM application from R3 system to SRM system.

d. Transferred Vendor receives User ID creation link on his supplied mail Id.

e. Vendor creates his User ID and Password for e-tendering applications by accessing link sent to his mail ID.

III. Online Self Registration (Temporary registration for applicant not registered with BMC)

- a. Vendor fills up Self Registration form via accessing BMC portal.
- b. Vendor Transfer cell (same as mentioned above) accesses Supplier Registration system and accepts the Vendor request.
- c. Accepted Vendor receives User ID creation email with Link on his supplied mail Id.
- d. Vendor creates his User ID and Password for e-tendering application.

IV. CONTRACTORS BIDDING: Applicant will Quote and Upload Tender Documents

1. Access e-tender link of SRM Portal
2. Log in with User ID and Password
3. Selects desired Bid Invitation (he wants to bid)
4. To download tender documents bidders will have to pay online Tender fee. The same can be done by accessing Pay Tender Fees option. By this one will be able to pay Tender fee through Payment Gateway-If transaction successful, bidders can register his interest to participate. Without Registration one cannot quote for the Bid/Tender.
5. Bidders will download Tender Documents from Information from purchaser tab by accessing Purchaser document folder through collaboration 'C' folder link.
6. Bidders will upload Packet A related and Packet B related Documents in Packet A and Packet B folder respectively by accessing these folders through "My Notes" Tab and collaboration folder link.
7. All the documents uploaded have to be digitally signed and saved. Bidders can procure their digital signature from any certified CA's in India.
8. Bid security deposit / EMD, should be paid online as mentioned in tender. Also, ASD, if applicable, should be paid online as mentioned in tender.
9. For commercial details (in Packet C) bidders will fill data in Item Data tab in Service Line Item via details and quotes his "Percentage Variation" (i.e.% quoted) figure.(If entered '0' it will be treated as at par. By default the value is zero only.
10. Applicants to check the bid, digitally signs & save and submit his Bid Invitation.

11. Applicants can also save his uploaded documents/commercial information without submitting the BID for future editing through 'HOLD' option.
12. Please note that "Hold" action do not submit the Bid.
13. Applicants will receive confirmation once the Bid is submitted.
14. Bid creator (BMC) starts Bid Opening for Packet A after reaching End Date and Time and Bid Evaluation process starts.

As per Three Packet system, the document for Packet **A & B** are to be uploaded by the tenderer in 'Vendor's document' online in Packet A & B. Before purchasing/ downloading the tender copy, tenderer may refer to post- Qualification criteria mentioned in e-Tender Notice.

The tenderer shall pay the EMD/Bid Security through payment gateways before submission of Bid.

The e-tender is available on BMC portal, <http://portal.mcgm.gov.in>, as mentioned in the Header Data of the tender. The tenders duly filled in should be uploaded and submitted online on or before the end date of submission. The Packet 'A', Packet 'B' & Packet 'C' of the tenderer will be opened as per the time-table shown in the Header Data in the office of Dy.Ch Eng.(Sewerage Project) P&D.

The Municipal Commissioner reserves the right to reject all or any of the e-Tender(s) without assigning any reason at any stage. The dates and time for submission and opening the tenders are as shown in the Header Data. If there are any changes in the dates the same will be displayed on the BMC Portal (<http://portal.mcgm.gov.in>).

SECTION - 6
INSTRUCTIONS TO APPLICANTS

INSTRUCTIONS TO APPLICANTS

➤ **A) Scope of Application**

The Authority wishes to receive Applications for Qualification in order to SELECT experienced and capable Applicants for the Bid Stage.

➤ **B) Eligibility of Applicants**

The Municipal Corporation of Greater Mumbai (BMC) invites e-tender to appoint Contractor for the aforementioned work from contractors of repute, multidisciplinary engineering organizations i.e. eminent firm, Proprietary/Partnership Firms/ Private Limited Companies/ Public Limited Companies/Companies registered under the Indian companies' act 2013, the contractors registered with the Municipal Corporation of Greater Mumbai, (BMC) in **Class II and above as per new registration** (excluding those who are blacklisted or against whom F.I.R. has been filed) or those having equivalent or more work experienced from Central or State Government/Semi Govt. Organization/Central or State Public Sector Undertakings, will be allowed subject to condition that, the contractors who are not registered with BMC shall apply for registration with BMC (in same class equivalent to BMC) within three months from the date of issue of work order, otherwise their Bid Security i.e. E.M.D (Earnest Money Deposit) will be forfeited/recovered and an amount equal to Registration Fee of respective class will be recovered as penalty.

To be eligible for pre-qualification and short-listing, an Applicant shall fulfill the following conditions of eligibility:

1. Eligibility

1.1 Technical Capacity (Project Experience)

The tenderer(s) in their own name should have satisfactorily completed the work of similar nature BMC /Semi Govt. /Govt. & Public Sector Organizations during **last seven (7) years** ending last day of month previous to the one in which bids are invited as a prime Contractor (or as a nominated sub-Contractor, where the subcontract had involved similar nature of work as described in the scope of works in this bid document, provided further that all other qualification criteria are satisfied)

a) Three completed works of similar nature each costing **30%** of estimated cost. **(i.e. Rs. 1,29,45,630.00**

Or

b) Two completed works of similar nature each costing **40%** of estimated cost. **(i.e. Rs. 1,72,60,840.00**

Or

- c) **One completed** work of similar nature each costing **60%** of estimated cost. (i.e. **Rs. 2,58,91,260.00**)

The value of completed works shall be brought to current costing level by enhancing the actual value of work at compound rate of 10 % per annum; calculated from the date of completion to last date of receipt of applications for tenders.

In order to meet technical capacity MoU is allowed as per clause 84 (GCC).

1.2 Financial Capacity

Bidder must achieved an average annual financial turnover as certified by 'Chartered Accountant' (in all classes of civil engineering construction works only) equal to **30%** of the estimated cost of work (i.e. **Rs 1,29,45,630.00**) in **last three (3) financial years** immediately preceding the Financial Year in which bids are invited i.e **1st April 2019 to 31st March 2022.**

- To ascertain this, tenderer(s) shall furnish /upload the financial statement (Audited balance sheet) duly certified by Chartered Accountant.
- The turnover can be enhanced by 10% every year to bring the present level.

1.3 Similar Experience:

- a) For assessing the technical capacity of bidder, similar work shall means, the completed works of laying Gravity/rising mains in Sewerage networks or SWD drain network work or H.E. network work.
- b) The bidder shall have similar experience of providing and laying Sewer/Water/Petroleum/Gas line / Telecommunication cables / High Power Cables by HDD (Horizontal Directional Drilling) in extremely hard Rock having hardness factor not less than 6 (Mohs) and 250 Mpa for the minimum length of 200 RM in completed or ongoing project during last 7 years prior to invitation of tender.

OR

They should submit memorandum of understanding (MOU) with a firm and the firm should have laying experience as per the requirement given above either in his own capacity or as an officially approved Sub- contractor. The tenderer has to submit all the credentials of the firm with whom they are entering with MOU.

1.4 Bid Capacity:

The bid capacity of the prospective bidders will be calculated as under:

Assessed Available Bid Capacity = (A* N* 2 - B)

Where,

A = Maximum value of Civil Engineering works completed in any one year (year means Financial year) during the last five years (updated to the price level of the Financial year in which bids are received at a rate of 10% per year) taking into account the completed as well as works in progress i.e works executed within **1st April 2017 to 31st March 2022**.

N = Number of years prescribed for completion of the Project/Works, excluding monsoon period, for which these bids are being invited. (E.g. 7 months = 7/12 year) For every intervening monsoon 0.33 shall be added to N.

B = Value of existing commitments (only allotted works) on the last date of submission of bids as per bidding document and on-going works to be completed during the period of completion of the Project/Works for which these bids are being invited.

Note: The statement showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be attached along with certificates duly signed by the Engineer-in Charge, not below the rank of an Executive Engineer or equivalent.

Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- made misleading or false representation in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- Record for poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, or financial failures etc

D). Equipment Capabilities as required for this special work

The equipments/ machineries as required are mentioned in **Special directions to the Tenderer** at Sr. no. 91.

Note: Bidders shall submit the undertaking for equipment capability and other undertakings as such on a single Rs.500/- stamp paper. (PROFORMA VII Equipment Capabilities as at pg. 256)

E). Technical Personnel

As it is a special work, sewer line laying by Trenchless Technology (i.e Micro tunneling and pipe jacking / Horizontal Directional Drilling etc), the requirement of Technical staff as required for this work are as follows:-

Requirement of Technical staff (of Major + Minor Component)		Minimum Experience (years)	Designation
Qualification	Number		
1. Graduate Engineer	01	10	Project Manager
2. Graduate Engineer (Civil)	01	5	Project Engineer
3. Graduate Engineer or Diploma Engineer	04	5 or 10 Respectively	Site Engineer
4. Graduate Engineer (Civil)	01	5	Billing Engineer

Additional Technical Personnel:-

- As it is a special work, sewer line laying by Trenchless Technology (i.e Microtunneling and pipe jacking / Horizontal Directional Drilling etc), it requires special operators for operating MTBM and HDD are as follows,

HDD Machine Operator.

The e-tenderer must have suitably experienced personnel to operate the microtunneling / HDD equipment in soft and hard ground including extra-ordinary hard rock and varying and waterlogged strata. The e-tenderer will supply information on master operator and assistant operators and their alternates. The prime and assistant operators shall be available throughout the construction period and should meet the experience requirements specified below:-

- Master Operator

The master operator or the alternate shall have driven HDD machines between 100 mm and above (similar to the tunneling equipment proposed for the project) for a length of at least 1000 meter in any variable soil conditions including hard rock and waterlogged ground conditions.

- Assistant Operators

The assistant operators shall have driven micro HDD machines between 100 mm and above (similar to the tunneling equipment proposed for the project) for a length of at least 500 meter in any variable soil conditions including hard rock and waterlogged ground conditions.

Microtunneling / HDD equipment operators' experience (Summary)

	Name of the Person (Main/alternate)	Total Experience (years)	Total length (m) driven to date in hard rock having UCS upto 250Mpa in HDD operations
Master Operator (One for each machine)			
Alternate Master Operator (One for each machine)			
Assistant Operator 1 (One for each machine)			
Assistant Operator 2 (One for each machine)			

Rate of recovery in case of non-compliance of the clause be stipulated at following rates:-

Sr. No.	Qualification	Experience (years)	Rate of Recovery
1	Project Manager with degree	10	Rs.30000/-p.m.
3	Graduate Engineer	5	Rs.25000/-p.m.
3	Graduate Engineer	2	Rs.15000/-p.m.
5	Diploma Engineer	5	Rs.15000/-p.m.

Note: Scanned self attested duly digitally signed/Attested copies of qualification certificates and details of work experience shall be submitted and uploaded in Packet B

F) TIME PERIOD OF THE PROJECT:

Entire project should be completed and delivered within 11 Months of time from the date of award of contract that excludes Monsoon.

The time allowed for carrying out the work as entered in the Tender shall be strictly observed by the Contractor and shall be reckoned from the date on which the Letter of Acceptance is given to the Contractor. The work shall throughout the stipulated period of the Contract be proceeded with all due diligence as time being deemed to be the essence of the contract on the part of the Contractor. On failing to do so, the Contractor shall pay as compensation an amount which shall be governed as per Clause - 8(e) of Standard General Conditions of Contract.

The Contractor should complete the work as per phase given below:

¼ of the work in	..	1/4 of the time
½ of the work in	..	1/2 of the time
¾ of the work in	..	3/4 of the time
Full of the work in	..	Full of the time

Full work will be completed in 11 Months excluding monsoon.

The programme for completion of work shall be a part of the Contract Document in the form of Bar Chart / Gantt chart /PERT /Milestone etc. The Contractor is supposed to carry out the work and keep the progress as per Bar Chart/GANTT Chart /PERT /Milestone etc. The Contractor shall complete the work as per the Schedule given in the Contract and the programme submitted by the Contractor.

G) Contract Execution

All required documents for execution of the contract shall be submitted within 30 days from the date of issue of letter of Acceptance. If the documents are not submitted within the stipulated time a penalty of Rs 5000/- per day will be applicable to the contractor. All contract documents need to be duly affixed with stamp duty properly signed along with evidence/proof of payment of security/contract deposit/ within 30 days from the date of letter of Acceptance received by him.

H) If the amount of the Contract Deposit to be paid above is not paid within 30 days from the date of issue of Letter of Acceptance, the Tender / Contractor already accepted shall be

considered as cancelled and legal steps be taken against the contractor for recovery of the amounts.

I). The amount of Security Deposit retained by the BMC shall be released after expiry of period up to which the contractor has agreed to maintain the work in good order is over. In the event of the contractor failing or neglecting to complete the rectification work within the period up to which the contractor has agreed to maintain the work in good order, the amount of security deposit retained by BMC shall be adjusted towards the excess cost incurred by the Department on rectification work.

J). Action when whole of security deposit is forfeited:

In any case in which under any Clause of this contract, the contractor shall have rendered himself liable to pay compensation amounting to the whole of this security deposit whether paid in one sum or deducted by installments or in the case of abandonment of the work owing to serious illness or death of the contractor or any other cause, the Engineer on behalf of the Municipal Commissioner shall have power to adopt any of the following process, as he may deem best suited to the interest of BMC -

- (a) To rescind the contract (for which recession notice in writing to the contractor under the head of Executive Engineer shall be conclusive evidence) and in that case, the security deposit of the contract shall stand forfeited and be absolutely at the disposal of BMC.
- (b) To carry out the work or any part of the work departmentally debiting the contractor with the cost of the work, expenditure incurred on tools and plant, and charges on additional supervisory staff including the cost of work-charged establishment employed for getting the un-executed part of the work completed and crediting him with the value of the work done departmentally in all respects in the same manner and at the same rates as if it had been carried out by the contractor under the terms of his contract. The certificate of the Executive Engineer as to the costs and other allied expenses so incurred and as to the value of the work so done departmentally shall be final and conclusive against the contractor.
- (c) To order that the work of the contractor be measured up and to take such part thereof as shall be un-executed out of his hands, and to give it to another contractor to complete, in which case all expenses incurred on advertisement for fixing a new contracting agency, additional supervisory staff including the cost of work charged establishment and the cost of the work executed by the new contract agency will be debited to the contractor and the value of the work done or executed through the new contractor shall be credited to the contractor in all respects and in the same manner and at the same rates as if it had been carried out by the

contractor under the terms of his contract. The certificate of the Executive Engineer as to all the cost of the work and other expenses incurred as aforesaid for or in getting the un-executed work done by the new contractor and as to the value of the work so done shall be final and conclusive against the contractor.

In case the contract shall be rescinded under Clause (a) above, the contractor shall not be entitled to recover or be paid any sum for any work therefore actually performed by him under this contract unless and until the Executive Engineer shall have certified in writing the performance of such work and the amount payable to him in respect thereof and he shall only be entitled to be paid the amount so certified. In the event of either of the courses referred to in Clause (b) or (c) being adopted and the cost of the work executed departmentally or through a new contractor and other allied expenses exceeding the value of such work credited to the contractor's amount of excess shall be deducted from any money due to the contractor, by BMC under the contract or otherwise, howsoever, or from his security deposit or the sale proceeds thereof provided, however, the contractor shall have no claim against BMC even if the certified value of the work done departmentally or through a new contractor exceeds the certified cost of such work and allied expenses, provided always that whichever of the three courses mentioned in clauses (a), (b) or (c) is adopted by the Executive Engineer, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered in to any engagements or made any advance on account of or with a view to the execution of the work or the performance of the contract.

K). Contract may be rescinded and security deposit forfeited for bribing a public officer or if contractor becomes insolvent

If the contractor assigns or sublets his contracts or attempt so to do, or become insolvent or commence any proceeding to get himself adjudicated and insolvent or make any composition with his creditors, or attempt so to do or if bribe, gratuity, gift, loan, perquisite, reward or advantage, pecuniary or otherwise, shall either directly or indirectly be given promised or offered by the contractor or any of his servants or agents through any public officer, or person in the employ of BMC/Govt. in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract the Engineer In-charge may thereupon, by notice in writing rescind the contract and the Security Deposit of the Contractor shall thereupon stand forfeited and be absolutely at the disposal of BMC and the same consequences shall ensure as if the contract

had been rescinded under above clause J hereof; and in addition the contractor shall not be entitled to recover or be paid for any work therefore actually performed under the contract.

L) General Information:-

Categories and classes available for Civil Contractors

Category	Description of work
Building C-I	Building and allied works, pile foundation, precast or cast in situ concrete works, diaphragm walls, ground anchors and allied works, water proofing, leak proofing of various types of structures.
Bridges C-II	Bridges including road over bridges, flyover/foot over bridges, subways and culverts.
Roads C-III	Road works of various types including storm water drains, culverts and training/desilting of nallas, underground storm water drains.
Water Supply C-IV	Laying of water mains, rising mains, water pumping stations, reservoirs, head works.
Sewerage C-V	Laying of sewers, rising mains and underground storm water drains, sewage pumping stations, treatment plants, outfalls, etc.

Classes available according to the limits of works, amount of solvency, Registration fees and amount of standing deposit prescribed for each class.

Class	Works limit	Solvency amount (` in Lakhs)	Scrutiny fees	Registration fees	Renewal fees
AA	Without limit	60	4000	8000	4000
A	Upto 3 Crores	30	4000	8000	4000
B	Upto 1 Crore	20	2000	4000	2000
C	Upto 50 Lakhs	15	2000	4000	2000
D	Upto 25 Lakhs	10	2000	4000	2000
E	Upto 10 Lakhs	5	2000	4000	2000

Classes available for Civil Engineering works according to the limits of works, amount of solvency, Registration fees and amount of standing deposit prescribed for each class. (as per the reframed rules circulated under number E/M&R/517/Civil dtd 26.05.2015)

MINIMUM FINANCIAL AND ORGANIZATIONAL REQUIREMENTS FOR CIVIL ENGINEERING DISCIPLINE

(Rs. in Lakhs)

Sr. no.	Class	Upper limit of Tendering	Minimum Solvency	Total Turn-Over in Last 3 Years	Cost of Single Work Completed within Last 3 Years	No. of Civil Engineers Employee
1	2	3	4	5	6	7
1	I (A)	Without Limit	200	4000	1500	4 Graduate with 5 yrs or 1 Graduate with 5 yrs and 5 Diploma Holder with 7yrs experience
2	I (B)	2500	175	2500	750	3 Graduate with 5 yrs or 1 Graduate with 5 yrs and 4 Diploma Holder with 7yrs experience
3	I (C)	1500	150	1500	300	3 Graduate with 5 yrs or 1 Graduate with 5 yrs and 4 Diploma Holder with 7yrs experience
4	II	750	100	750	150	2 Graduate with 3 yrs or 1 Graduate with 3 yrs and 3 Diploma Holder with 5 yrs experience
5	III	300	75	300	90	2 Graduate with 3 yrs or 1 Graduate with 3 yrs and & 2 Diploma Holder with 5 yrs experience
6	IV	150	40	150	50	1 Graduate with 1 yrs OR 1 Diploma Holder with 3 yrs experience

MINIMUM FINANCIAL AND ORGANIZATIONAL REQUIREMENTS FOR CIVIL ENGINEERING DISCIPLINE
(Rs. In Lakhs)

Sr. no.	Class	Upper limit of Tendering	Minimum Solvency	Total Turn-Over in Last 3 Years	Cost of Single Work Completed within Last 3 Years	No. of Civil Engineers Employee
7	IV(A)	90	25	90	30	1 Graduate with 1 yrs OR 1 Diploma Holder with 3 yrs experience
8	V	50	15	50	15	1 Graduate with 1 yrs OR 1 Diploma Holder with 3 yrs experience
9	V(A)	30	8	00	0	1 Fresh Graduate OR 1 Fresh Diploma Holder
10	VI	15	2	00	0	1 Fresh Graduate OR 1 Fresh Diploma Holder
11	VII	10	1	0	0	1 Fresh Graduate OR 1 Fresh Diploma Holder
12	VIII	5	0.50	0	----	1 Fresh Graduate OR 1 Fresh Diploma Holder
13	IX	3	0.25	----	----	1 Fresh Graduate OR 1 Fresh Diploma Holder

- Note: - 1) A Solvency Certificate registered beyond 12 months from the date of its issue will not be considered. Certificate of Solvency (in Hindi/Marathi/English) shall be obtained from scheduled or Nationalise Bank, in the name of the applicant / Firm /Company only
- 2) Turn-over shall be supported with work completion / performance certificate of civil works only. In case of works carried out in Private Organization; T.D.S. Certificate is essential and certificate from Licensed Architect is necessary.
- 3) Cost of single work criteria will be governed as given in following Table

MUNICIPAL CORPORATION OF GREATER MUMBAI

NOTICE

SUB: "RULES GOVERNING THE REGISTRATION OF CONTRACTOR/S FOR CIVIL AND MECHANICAL & ELECTRICAL ENGINEERING WORKS – 2016".

All are requested to note that the existing rules for the registration of contractor/s are now reframed and the New Rules-2016 titled, "**RULES GOVERNING THE REGISTRATION OF CONTRACTOR/S FOR CIVIL AND MECHANICAL & ELECTRICAL ENGINEERING WORKS – 2016**" are made effective from 01/12/2016.

Therefore, henceforth no new registration will be done except under the New Rules of 2016.

Booklet of the new registration rules and application form will be available from Executive Engineer (Monitoring & Registration) Cell's office, provisionally from 5th December 2016 onwards on payment of prescribed charges amounting Rs.1,000/-+VAT each for booklet and application form separately.

At present, there are few contractors who are registered as per Registration Rules 1992 & Registration Rules 2015. Even after implementation of Registration Rules 2016, all these contractors registered earlier will also be allowed to participate in bidding procedure of MCGM, till the expiry of validity of their registration. Thereafter they have to get registered as per Registration Rules 2016 only. If desired they may apply for registration as per Registration Rules 2016, even before expiry of their existing registration.

Registration as per rules 1992 will be phased out completely in Dec 2017 and registrations as per rules 2015 will be phased out completely in December 2019. Thereafter, tenders will be invited from the contractors registered as per rules 2016 only and any contractor, whether Civil or M&E, who is not registered as per the new rules, will not be eligible to participate in the bidding procedure of MCGM.

For further details please visit Tender / Manual on MCGM portal on <http://portal.mcgm.gov.in>

sd/-

City Engineer

sd/-

C.A. (Finance)

sd/-

Director (E. S. & P.)

Table – I
MINIMUM FINANCIAL REQUIREMENTS FOR CIVIL ENGINEERING DISCIPLINE

(Rs. In Lakhs)

Class	Amounts upto which works can be taken up	Minimum Solvency	Average turnover of work done during last 3 years	Estimated cost of work in hand during current year
I(A)	Without Limit	150	300	450
I(B)	2500			
I(C)	1500			
II	750	75	200	300
III	300	30	90	150
IV	150	15	60	80
IV(A)	90	9	40	60
V	50	5	25	30
V(A)	30	3	15	10
VI	15	2	7.5	10
VII	7	1	1.5	3
VIII	3	0.50	1	1.5
IX	2	0.25	0.5	1

Note: -

- 1) A Solvency Certificate shall not be accepted for the purpose of registration / renewal / up-gradation more than 12 months after the date on which it was granted. Certificate of Solvency (in Hindi / Marathi /English) shall be obtained from scheduled or Nationalised Bank, in the name of the applicant / Firm / Company only.
- 2) Turn-over shall be supported with work completion / performance certificate of Civil / M&E works only. In case of works carried out in Private Organization; T.D.S. Certificate (Form No.16/ 26AS) is essential and certificate from Licensed Architect and Chartered Accountant is necessary.
- 3) Respective amounts mentioned against class shows upper tendering limit of that class, however number of works can be carried out simultaneously will be governed by the bid capacity of the contractor/s
- 4) The application for New Registration shall be considered only if the contractor has carried out / is carrying out **at least two sizable works** where the value of work done is in each case is not less than the maximum limits of the category two stages below the category for which he has applied (e.g. Category – III for registration in Category – I and category IV for registration in category II and so on). The weightage shall be given for works carried out for private persons / bodies shall be 100% of the value of work as certified by the Registered Chartered Accountant or Registered income Tax Practitioner (Format X).

20

Submission of Tenders

PACKET – A

The Packet 'A' shall contain scanned certified copies of the following documents

Scrutiny of this packet will be done strictly with reference to only the scanned copies of Documents uploaded online in packet 'A'

- a) The tenderer shall upload the screenshot of receipt of payment of EMD.
- b) Valid Registration Certificate.
- c) Valid bank solvency certificate for minimum solvency amount should be issued within period of 6 months prior to the date of submission of e-tender.
 - i) For Class II as per registration (Year 2015) – Rs. 100Lakhs.
 - ii) For Class II as per new registration (Year-2016) - Rs. 75 Lakhs.
- d) A document in support of Registration under Goods & Service Tax (GST).
- e) Certified copies of valid 'PAN' documents and photographs of the individuals, owners, Karta of Hindu undivided Family, firms, private limited companies, registered co-operative societies, partners of partnership firms and at least two Directors, if number of Directors are more than two in case of Private Limited Companies, as the case may be. However, in case of Public Limited companies, Semi Government Undertakings, Government Undertakings, no 'PAN' documents will be insisted.
- f) Latest Partnership Deed in case of Partnership firm duly registered with Chief Accountant (Treasury) of BMC.
- g) The registered power of attorney shall be submitted in the name of person who is submitting the bid.
- h) The bidders shall categorically provide their Email-ID in packet 'A'.

NOTE:

- If the tenderer(s) withdraw tender offer during the tender validity period, his entire E.M.D shall be forfeited.
- If it is found that the e-tenderer has not submitted required curable documents in Packet "A" then, the shortfalls will be communicated to the tenderer through e-mail only and compliance required to be made through e-mail within a time period of **three working days** (as specified through e-mail) otherwise tenderer will be treated as non-responsive.

PACKET – B

The Packet ‘B’ shall contain scanned certified copies of the following documents –

- a) The list of similar type of works as stated in para ‘A’ of Post qualification criteria successfully completed during the last seven years in prescribed proforma, in the role of prime contractor. Information furnished in the prescribed proforma (Proforma – I) shall be supported by the certificate duly self-attested. Documents stating that it has successfully completed during the last seven years at least one contract of similar works as stated in para ‘A’ of Post qualification. Bidder should submit information of one/two/three similar type of work in Proforma (Performa- III)
- b) Annual financial turnover for preceding three financial years (i.e 1st April 2019 to 31st March 2022) as certified by Chartered Accountant preceding the Financial Year in which bids are invited. Copies of Applicants duly audited balance sheet and profit and loss account for the preceding three financial years preceding the Financial Year in which bids are invited. Also, the Annual financial turnover for preceding Five financial years (i.e 1st April 2017 to 31st March 2022) as certified by Chartered Accountant preceding the Financial Year in which bids are invited (Proforma – II) will be considered for calculating bid capacity
- c) Documents stating that, it has access to or has available liquid assets, unencumbered assets, lines of credit and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements for the subject contract in the event of stoppage, start-up, or other delay in payment, of the minimum 15% of the cost of the work tendered for, net of the tenderer's commitment of other contracts (Certificate from Bankers / C.A./Financial Institution shall be accepted as a evidence).
- d) The bidder shall give undertaking on Rs 500/-stamp paper that it is his/their sole responsibility to arrange the required machineries either owned/on lease or hire basis, at site before start of the work

New and original works: The bidder should undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with assessment study of requirements of equipment/plants & machineries to allow the employer to review their proposal. The bidder shall ensure his commitment to make the arrangements of the required equipment on the day of commencement or with respect to the progress of the work in phases, as per the instruction of site incharge on an undertaking of Rs. 500 stamp paper to be submitted along with the bid in packet B.

However this condition in no way shall dilute the respective condition in registration rules of BMC.

Bidder should submit information for technical personnel in proforma (Proforma –IV), information for equipment, machinery vehicles in proforma (Proforma –V/A & V/B).

- e) Details of works in hand and for which bid is already submitted (Proforma VI-A & VI-B) (original), along with copies of work orders & attested copies of percentage of works completed or part thereof.
- f) Statement showing assessed available Bid Capacity.
- g) The undertaking of Rs.500/- stamp paper as per the proforma annexed in ‘Annexure B (Pre Contract Integrity Pact), C(Indemnity Bond)’, Irrevocable undertaking.
- h) Details of machinery Capabilities (Proforma-VII)
- i) Details of Technical Personnel Capabilities (Proforma VIII)
- j) Information on litigation history in which tender is invited for last five years from the last five years from the date of submission of bid.(as per circular no. MGC/F/6569 dated 25.09.2018.)
- k) Pre bid meeting minutes, signed by copy of Addendum if any.

Note: Bidders shall submit the undertaking for equipment capability and other undertakings as such on a single Rs. 500/- stamp paper.

- j) The tenderers shall upload work plan as per the following outline:
 1. GANTT chart/ PERT/ CPM chart showing the completion of work within prescribed time period, considering major activities.
 2. Organizational set up envisaged by the contractors.
 3. Plant & equipment proposed to be deployed for this work.
 4. Site Offices and Laboratories proposed to be set up.
 5. A note on how the whole work will be carried out (work plan including methodology).
 6. Quality management plan.
 7. All the activities included in the Scope of Work shall be covered in the work plan.
- i) Certificate from the M.C.G.M approved sewer pipe manufacturer stating the details of Manufacturer, casting yard of sewer pipes of required diameter and timely supply of sewer pipes in adequate quantity.

Note:

- i. The Electrical / Mechanical work shall be got carried out by the civil contractors through the contractors registered with BMC. in Electrical Category. Information about the registered contractors shall be obtained from the office of the Ch.E. (M&E)/ E.E. (Monitoring & Registration Cell). Attested scanned copy of the valid registration certificate in Electrical Category shall be uploaded with the tender along with the undertaking from the registered Electrical Contractor stating his willingness to carry out the tender work.
- ii. The successful bidder shall submit valid registration certificate under E.S.I.C., Act 1948, if the tenderer has more than 10 employees /persons on his establishment (in case of production by use of energy) and 20 employees/persons on his establishment (in case of production without use of energy) to BMC as and when demanded. In case of less employees/persons mentioned above then the successful bidder has to submit an undertaking to that effect on Rs. 200 stamp paper as per circular u/no. CA/FRD/I/65 of 30.03.2013.
- iii. The successful bidder shall submit valid registration certificate under E.P.F. & M.P., Act 1952, if tenderer has more than 20 employees/persons on his establishment, to BMC as and when demanded. In case if the successful bidder has less employees/persons mentioned above then the successful bidder has to submit an undertaking to that effect on Rs. 200 stamp paper as per circular u/no. CA/FRD/I/44 of 04.01.2013.

Note:

- If it is found that the e-tenderer has not submitted required curable documents in Packet “B” then, the shortfalls will be communicated to the tenderer through e-mail only and compliance required to be made through e- mail within a time period of **three working days** (as specified in the departmental e-mail) otherwise tenderer will be treated as non-responsive.

PACKET – C

Online tender filled in either percentage plus or minus (above or below), or at par. (There is no separate provision to quote % in physical form, this is a part in Header Data of online Tendering). For Packet 'C' tenderer(s) will fill data in 'Item Data Tab' in Service Line Item via Details and quotes his percentage variation figures. **(If entered '0' it will be treated as 'at par'**. By default the value is zero only).

Note: In case of rebate/premium of 15% and above as quoted by the tenderer, the rate analysis of major items shall be submitted by L1 and L2 bidder after demand notification by e-mail to bidders by concerned Dy.Ch.Eng.S.P.(P&D) The rate analysis should be submitted by the e-tender through e- mail within a time period of three working days (as specified in the demand notification). Non submission of rate analysis due to failure of system, any other reasons is not acceptable. The format for rate analysis is annexed at Annexure D.

BID SECURITY OR EMD

- The Bidder shall furnish, as part of the Bid, Bid Security/EMD, in the amount specified in the Bid Data Sheet. This bid security shall be in favor of the authority mentioned in the Bid Data Sheet and shall be valid till the validity of the bid.
- The tenderers shall pay the EMD online instead paying the EMD at any of the CFC centers in BMC Ward Offices.
- Any bid not accompanied by an acceptable Bid Security and not secured as indicated in sub-clause mentioned above, shall be rejected by the Employer as non-responsive.
- The Bid Security of the successful Bidder will be discharged when the Bidder has signed the Agreement and furnished the required Security Deposits.
- The Bid Security/ EMD and ASD of L-2 and other higher bidders (L-3,L-4 etc.) shall be refunded immediately after opening of financial bid.
- In case, the successful bidder becomes non-responsive or successful bidder withdraws the bid or is unwilling to extend the bid validity period, in such circumstances, if L-2 bidder is agreeable to extend the bid validity period and ready to deposit the requisite amount of bid security/EMD and ASD to the department within the stipulated time period i.e. 15 day, the department will process further as per normal procedure. .
- The Bid Security may be forfeited:
 - a) if the Bidder withdraws the Bid after bid opening (opening of technical qualification part of the bid during the period of Bid validity;

- b) in the case of a successful Bidder, if the Bidder fails within the specified time limit to:
- i. sign the Agreement; and/or
 - ii. Furnish the required Security Deposits.
1. The cases wherein if the shortfalls are not complied by a contractor, will be informed to Registration and Monitoring Cell. Such non-submission of documents will be considered as 'Intentional Avoidance' and if three or more cases in 12 months are reported, shall be viewed seriously and disciplinary action against the defaulters such as banning/de-registration, etc. shall be taken by the registration cell with due approval of the concerned AMC.
2. No rejections and forfeiture shall be done in case of curable defects. For non-curable defects the 10% of EMD shall be forfeited and bid will be liable for rejection.

Note:

i) Curable Defect shall mean shortfalls in submission such as:

- a) Non-submission of following documents,
- i) Valid Registration Certificate
 - ii) Valid Bank Solvency
 - iii) GST Registration Certificate
 - iv) Certified Copies of PAN documents and photographs of individuals, owners, etc
 - v) Partnership Deed and any other documents
 - vi) Undertakings as mentioned in the tender document.

ii) Non-curable Defect shall mean

- a) In-adequate submission of EMD/ASD amount,
- b) In-adequacy of technical and financial capacity with respect to Eligibility criteria as stipulated in the tender.
- c) Wrong calculation of Bid Capacity,
- d) No proper submission of experience certificates and other documents, etc.

BID VALIDITY

Bids shall remain valid for a period of not less than one eighty (180) days after the deadline date for bid submission specified in Bid Data Sheet. A bid valid for a shorter period shall be rejected by the Employer as non-responsive.

- In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period.

The request and the bidders' responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his Bid Security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his bid security for a period of the extension.

DEFECT LIABILITY PERIOD

- The Contractor is expected to carry out the construction work in Workmen like manner so as to meet the requirement and specification for the project. It is expected that the Workmanship and materials will be reasonably fit for the purpose for which they are required.
- Defects or defective work is where standard and quality of workmanship and materials as specified in the contract is deficient. Defect is defined as a failure of the completed project to satisfy the express or implied quality or quantity obligations of the construction contract. Defective construction works are as the works which fail short of complying with the express descriptions or requirements of the contract, especially any drawings or specifications with any implied terms and conditions as to its quality, workmanship, durability, aesthetic, performance or design. Defects in construction projects are attributable to various reasons.
- Some of the defects are structural defects results in cracks or collapse of faulty defective plumbing, inadequate or faulty drainage system, inadequate or faulty ventilation, cooling or heating systems, inadequate fire systems etc. The defects could be various on accounts of different reasons for variety of the projects.
- The Engineering In charge/Project Officer shall issue the practical completion certificate for the project. During the Defect Liability Period which commences on completion of the work, the Engineering In charge shall inform or the contractor is expected to be informed of any defective works by the Employer's representative of the defects and make good at contractor's cost with an intention of giving opportunity to the contractor of making good the defects appeared during that period. It is the contractor's obligation under the contract to rectify the defects that appear during Defect Liability Period and the contractor shall within a reasonable time after receipt of such instructions comply with the same at his own cost. The Engineering In charge/Project Officer shall issue a certificate to that effect and completion of making good defects shall be deemed for all the purpose of this contract to have taken place on the day named in such defect liability certificate.

- If defective work or workmanship or design have been knowingly covered-up or concealed so as to constitute fraud, commencement of the Defect Liability Period may be delayed. The decided period may be delayed until **discover** actually occurs on at least the defect could have been discovered with reasonable diligence, whichever is earlier.
- The DLP shall be as below:

Dept	Type of works	DLP
Roads Bridge	For cement concrete road/ Mastic works	5 years
	Asphalt work	3 years
	Paver Block	3 years
	Structural work	5 years
	General works	5 years
For other departments	Hydraulic Engineer, Water Supply Project, Sewerage Project, Storm Water Drain, Garden	3 years

- ❖ *In case of composite works i.e. having combinations of construction activities of different disciplines, the DLPs shall be approved by AMC.*
- Also, in case of defect, the Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at. The Defects Liability Period shall be extended for as long as Defects remain to be corrected. Every time notice of Defect/Defects is given, the Contractor shall correct the notified Defect/Defects within the duration of time specified by the Engineer's notice. The Engineer may issue notice to the Contractor to carry out removal of defects or deficiencies, if any, noticed in his inspection, or brought to his notice. The Contractor shall remove the defects and deficiencies within the period specified in the notice and submit to the Engineer a compliance report.
- It is the Completion Stage when the contractor has completed all of the works and fixed all of the defects that were on the list of issue by Engineer-in-charge. When this happens, the engineer must issue a 'Certificate of Completion'. On the issue of 'Certificate of Completion', the 'Defect Liability Period' starts. The contractor also must issue a 'Certificate statement' as an acknowledgment to the engineer not later than 14 days after the 'Certificate of Completion' has been issued. During the 'Defect Liability Period', the contractor has to obey all written instructions from the engineer to carryout repairs and fix any defects which appear in the Permanent Works. If the contractor does not ,due to his own faults finish the repair works or fix the defects by the end of 'Defect Liability Period', the 'Defect Liability Period' will continue until all works instructed by engineer is done.

SECURITY DEPOSIT AND PERFORMANCE GUARANTEE

A. Security Deposit

The security deposit shall mean and comprise of

- I) Contract Deposit and
 - II) Retention Money.
- I) **Contract Deposit** – The successful tender, here after referred to as the contractor shall pay an amount equal to **two (2)** percent of the contract sum shall be paid within thirty days from the date of issue of letter of acceptance in the form of valid bank guarantee of any approved bank in prescribed form given in Annexure.
- II) **Retention Money** – The contractor shall pay the retention money an amount equal to **five (5)** percent of the Contract Sum which will be recovered from the contractors every bill i.e. interim / running / final bill. The clause of retention money will not be applicable M. & E. Department.(as per circular no. CA/F/Project/21 dated 07.09.2021.)

B. Additional Security Deposit(As per circular no. CA/FRD/Project/42 Dtd. 09.01.2021.)

- 1) If the Lowest bidder quotes rebate less than 12% then the applicable **additional security deposit (ASD)** at the rate of 1% for each percentage quoted below 12% will not required to be paid online while submission of tender online.
- 2) After sanction/approval of competent authority to the contract cost, the lowest bidder shall deposit ASD in the Municipal Citizen Facility Centres in the form of demand draft as mentioned in Letter of Acceptance (LOA) within 15 working days as per prevailing practice and the receipt of the same shall be submitted to Head of Department.
- 3) If the first lowest bidder will not paid ASD within 15 working days after issue of LOA, then the EMD paid by the concern company will be forfeited and the company will be debarred for two years, similarly if the director/partner of the company is also working in other company as a director/partner then said company will also be debarred for two years.

C. Performance Guarantee

The successful tender, here after referred to as the contractor shall pay in the form of “Performance Guarantee” at different rates for different slabs as stated below:

Offer	PG applicable %
For premium, at par and rebate 0 to 12%	P.G. = 0.92% x contract sum applicable for rebate of 12%
For rebate of 12.01% and above	P.G. = {0.92% x contract sum applicable for rebate of 12%} +(X) x contract sum Where, X= percentage rebate quoted more than 12%

Note: Contract sum shall mean amount after application of rebate as quoted by the contractor with contingencies only and excluding price variation.

The PG shall be paid in one the following forms.

- i) Cash (In case guarantee amount is less than Rs.10,000/-)
- ii) Demand Draft (In case guarantee amount is less than Rs.1,00,000/-)
- iii) Government securities
- iv) Fixed Deposit Receipts (FDR) of a Schedule Bank.
- v) An electronically issued irrevocable bank guarantee bond of any Schedule bank or in the prescribed form given in Annexure.

Performance Guarantee is applicable over and above the clause of Security Deposit. Per Performance Guarantee will have to be paid as one complete B.G. & shall be valid till the defect liability period or finalization of final bill whichever is later.

This deposit will be allowed in the form of i) to v) as mentioned above and shall be paid within 15 days after receipt of Letter of acceptance.

D. Refund of Security Deposit

I. Refund of EMD

The Contract Deposit shall be released within 30 days after completion of 3rd year of DLP (in case of 5 years DLP) and after issue of 'Defect Liability Certificate' (in case of 1 or 2 or 3 years DLP) subject to no recoveries are pending against the said work, provided that the Engineer is satisfied that there is no demand outstanding against the Contractor. No claim shall be made against the Balance Contract Deposit after the issue of Defects Liability Certificate.

II. Refund of Retention Money

One-half (50%) of the Retention Money shall be released within 30 days of issue of 'Certificate of Completion' with respect to the whole of the Works. In the event the Engineer issues a Taking-over Certificate for a section or part of the Permanent Works,

only such proposition thereof as the Engineer determines (having regard to the relative value of such section or part of the Works) shall be considered by the Engineer for payment to the Contractor.

After releasing of 50% retention money, balanced 50% retention money shall be released to concern contractor by obtaining valid bank guarantee of equivalent amount (balanced 50% retention money).

Bank Guarantee is applicable over and above the clause of Security Deposit will have to be paid as one complete B.G. & shall be valid till the defect liability period or up to finalization of final bill whichever is later.

III. Refund of Additional Security Deposit

The additional security deposit shall be released within 30 days of issue of ‘Certificate of Completion’ with respect to the whole of the Works. In the event the Engineer issues a Taking-over Certificate for a section or part of the Permanent Works, only such proposition thereof as the Engineer determines (having regard to the relative value of such section or part of the Works) shall be considered by the Engineer for payment to the Contractor.

III. Refund of Performance Guarantee

The Deposit on account of performance guarantee shall be released within 30 days of completion of Defects Liability Certificate subject finalization of final bill whichever is later and no recoveries are pending against the said work, provided that the Engineer is satisfied that there is no demand outstanding against the Contractor.

❖ Summary of time of Refund of deposit is tabulated as follows:

a) Time of Refund for works having 3 years DLP

Deposits refunded after completion	After 3 yrs of DLP	After Completion of DLP
ASD + 50% of RM	CD+50% of RM	PG

b) Time of Refund for works having 1 or 2 or 3 years DLP

Deposits refunded after completion	After Completion of DLP
ASD + 50% of RM	CD+50% of RM+PG

***Note:**

- a) It shall be clearly mentioned that the BG shall be applicable for individual work/contract and clubbing of various contracts of the said contractor will not be allowed. In case of obtaining Bank Guarantee, it is necessary to mention that the same shall be valid further 6 months from the completion of defect liability period/ warranty period.
- b) It shall be the responsibility of the bidder to keep the submitted B.G. “VALID” for the stipulated time period in the tender & in case of its expiry it will attract penalization.
- c) Bank Guarantee should be issued by way of General Undertaking and Guarantee issued on behalf of the Contractor by any of the Nationalized or Scheduled banks or branches of foreign banks operating under Reserve Bank of India regulations located in Mumbai upto Virar & Kalyan. List of approved Banks is appended at the end of Instructions to Bidders (ITB). The Bank Guarantee issued by branches of approved Banks beyond Kalyan and Virar can be accepted only if the said Bank Guarantee is countersigned by the Manager of a Regional Branch of the same bank within the Mumbai City Limit categorically endorsing thereon that the said Bank Guarantee is binding on the endorsing Branch of the Bank or the Bank itself within Mumbai Limits and is liable to be enforced against the said Branch of the Bank or the bank itself in case of default by the Contractors furnishing the Bank Guarantee. The Bank Guarantee shall be renewed as and when required and/or directed from time to time until the Contractor has executed and completed the works and remedied any defects therein.

E. Legal + Stationary Charges: (As per applicable circular)

Successful tender shall pay the Legal Charges +Stationary charges as per Circular no Legal department circular 10318 dtd 24.03.2022

Contract Value						Legal+ Stationery Charges
upto	Rs.	10,000/-	To	Rs	50,000/-	Nil
from	Rs.	50,001/-	To	Rs.	1,00,000/-	Rs.6290/-
from	Rs.	1,00,001/-	To	Rs.	3,00,000/-	Rs. 10380/-
from	Rs.	3,00,001/-	To	Rs.	5,00,000/-	Rs. 12470/-
from	Rs.	5,00,001/-	To	Rs.	10,00,000/-	Rs. 14510/-
from	Rs.	10,00,001/-	To	Rs.	20,00,000/-	Rs. 16570/-
from	Rs.	20,00,001/-	To	Rs.	40,00,000/-	Rs.18660/-
from	Rs.	40,00,001/-	To	Rs.	1,00,00,000/-	Rs 20720/-

from	Rs.	1,00,00,001/-	To	Rs.	10,00,00,000/-	Rs 24450/-
from	Rs.	10,00,00,001/-	To	Rs.	20,00,00,000/-	Rs 28220/- (to be continue...)

The tenderers are requested to note that stationary charges as given in the table above will be recovered from the successful tenderer for supply of requisite prescribed forms for preparing certificate bills in respect of the work.

B. Stamp Duty: (As per applicable circular)

It shall be incumbent on the successful tenderer to pay stamp duty on the contract.

As per the provision made in Article 63, Schedule I of Maharashtra Stamp Act 2015, stamp duty is payable for “works contract” that is to say, a contract for works and labour or services involving transfer of property in goods (whether as goods or in some other form) in its execution and includes a sub-contract, as under :

(a)	Where the amount or value set forth in such contract does not exceed rupees ten lakh.	Five Hundred rupees stamp duty
(b)	Where it exceeds rupees ten lakhs	Five hundred rupees plus one hundred rupees for every Rs.1,00,000/- or part thereof, above rupees ten lakh subject to the maximum of rupees twenty five lakh stamp duty.

- ii. The successful bidder shall enter into a contract agreement with M.C.G.M. within 30 days from the date of issue of Work Order and the same should be adjudicated for payment of Stamp Duty by the successful bidder.
- iii. Further shortfall if any, in amount of stamp duty paid as against prescribed amount for the documents executed in Mumbai City & Mumbai Suburban District be recovered from the concerned work contractors and to deposit the deficit or unpaid Stamp Duty and penalty by two separate Demand Draft or Pay Order in favour of “Superintendent of Stamp, Mumbai” within 15 days from intimation thereof.
- iv. All legal charges and incidental expenses in this respect shall be borne and paid by the successful tenderer.
- v. As per para 54 read with 40(b) of Maharashtra Stamp duty Act, Stamp duty at the rate of 0.5 % is payable on total amount of Bank Guarantee submitted by Tenderer. If the time period of the Bank required to extend then the same shall be considered as new Bank Guarantee and again 0.5% stamp duty shall be applicable.

IMPORTANT DIRECTIONS

- 1) All the information uploaded shall be supported by the corroborative documents in absence of which the information uploaded will be considered as baseless and not accepted for qualification criteria. All the documents shall be uploaded with proper pagination. The page No. shall be properly mentioned in the relevant places.

The information shall be uploaded in the sequence as asked for with proper indexing etc. The Bidder shall be fully responsible for the correctness of the information uploaded by him.

- 2) Applicants/Bidders shall refer portal.mcgm.gov.in/tenders for “The Manual of Bid-Submission for Percentage Rate/Item Rate Tender Document.” The detail guidelines for creation and submission of bid are available in the referred document.

Any queries or request for additional information concerning this TENDER shall be submitted by e-mail to dychesnnpd@gmail.com. The subject shall clearly bear the following identification/ title: **"Queries/ Request for Additional Information: TENDER for P/L 400 mm dia. (OD) HDPE pipe sewer line (PN-6 Class- PE 80 grade : IS 14333) to correct grade and alignment on North side of JVLR from W.E.H. to Pratap Nagar, Jogeshwari(E) in K/E Ward by HDD method**

Any changes in mail ID will be intimated on the portal.

- 3) In case of **Equal Percentage** of lowest bidders (L1), the allotment of work shall be done by giving 48 hrs(**2 working days**) from the day of opening of packet C **on same BID-Document number for re-quoting** and such development needs to be done by IT department in BMC's SRM system. **Till such development is made; 'Sealed Bids' shall be called from the bidders quoting the same rates i.e. L1.**

In case of equal percentage of lowest bidders is obtained even after re-quoting, then the successful bidder will be decided by lottery system by concerned Ch.Eng.

The bidder shall need to submit the additional ASD if applicable within 7 days after receipt of notification issued by concerned Chief Engineer.

Also, the Performance Guarantee if applicable shall be paid in 15 days after receipt of Letter of Acceptance.

- 4) “Chapter XXI-Miscellaneous, Section 171(1) of GST Act, 2017 governs the ‘Anti Profiteering Measures’ (AFM).

As per the provision of this section, ‘Any reduction in rate of tax on any supply of goods or services or the benefit of input tax credit shall be passed on to the recipient by way of commensurate reduction in prices’.

Accordingly, the contractor should pass on the complete benefit accruing to him on account of reduced tax rate or additional Input tax credit, to BMC.

Further, all the provision of GST Act will be applicable to the tender.”

- As per MGC/F/7867 dt 12/10/15

All excavated & surplus material on site will be disposed by next of transportation or as directed by Site in charge on the cost of contractor. No additional / separate payment will be done to contractor

- As per circular MGC/F/7076 dt 30/08/18

It is directed to dispose of construction and demolition waste material by following due procedure in accordance with the provision of the Construction and Demolition Waste Management Rules-2016

- As per circular U/No.MGC/F/6342 dated 5.5.2018

Barricading shall be provided free of cost as per Circular vide U/No.MGC/F/6342 dated 5.5.2018 and as per Annexure I, II and III of Standard drawings and specifications with slogans and department wise colour codes.” The copy of circular is attached to this tender as a part of tender document. at pg.244 to 250.

- As per circular no. CA/FRT/623 dt 8/10/12

The party of second part shall duly observe & comply with all the provisions of law, rules & regulations referred by government / Municipal Corporation or any other competent authority applicable to the said tender work & the activity being conducted therein. Also, as per the circular CA/FRI/12 dt 21/06/12, 1% amount of labour cess will be recovered.

- As per circular MGC/F/6565 dated 25.09.2018

The bidder shall disclose the Litigation History in Packet ‘B’ under the heads “Details of Litigation History”.

If there is no Litigation History, the bidder shall specifically mention that there is no Litigation History against him as per the clause of Litigation History.

- As per circular Ch.E/487/Rds. Tr.& Br. dated 18.09.2018
Labour huts are not allowed on site.

- As per circular no. Dy.Ch.E./CPD/2025 dated 01.09.2015.

Formation of Grievance Redressal Committee(GRC) to address grievances from from the bidder regarding responsiveness, non-responsiveness in Packet A, Bor C in all the tender

- Revised policy for governing Extra- Excess saving is as per circular no. CA/F/Project/31 dated 26.10.2020.
- **Rate Analysis:**
- Rates shall be quoted in the prescribed format as directed by the engineer-in-charge only, without changing the quantity and units. Bidder shall fill the rates only, strictly no change in units, quantity or any other changes of the rate analysis allowed. Rate Analysis in prescribed format shall be submitted online (within 3 working days) from the date of communication on email to submit rate analysis, failing which 10% EMD will be forfeited.
- Overheads and Profit percentage shall be as per contractors working
- Bidder/s shall submit basic current market rate of individual items like cement, Coarse aggregate, fine aggregate, Tor steel, mild steel, Bitumen, Bricks, etc. (included in BOQ) separately.
- Description used in prevailing USoR for particular item shall be used as it is, while submitting Rate Analysis online. In case of any discrepancy bidder may approach to engineer in charge for formats of rate analysis, unit, quantity mentioned herein. decision of Engineer in charge will be binding on bidder
- If the quantities in above format/sequence are changed or if any discrepancies are found, the rate analysis submitted by bidder/s will be treated as non-workable and further action as per this bid document shall be initiated.
- Bidder/s shall submit quotation/consent from the reputed / registered supplier's /manufacturers of various materials along with the address, GST registration certificate and email-id of supplier/s.
- Bidder/s shall submit the GST Certificate of the supplier/s of various material.

Municipal Corporation of Greater Mumbai

No. Dy.Ch.Eng./SWM/3957/Qp. dt. 10/09/2018

CIRCULAR 28-9-2018

Subject: Implementation of the Construction and Demolition Waste Management Rules, 2016

Reference: i) Hon'ble Supreme Court's order in the Special Leave Petition (civil) No. D 23708/2017, dated 15/03/2018
ii) Hon'ble M.C. Sir's Approval w/no. MGC/F/7076 dtd. 30.08.2018

The Construction and Demolition Waste Management Rules, 2016 is applicable to 'every waste resulting from construction, re-modeling, repair and demolition of any civil structure of individual or organisation or authority who generates construction and demolition waste such as building materials, debris, rubble'.

Hon'ble Supreme Court vide order dated 15/03/2018, has directed to dispose of construction and demolition waste material by following due procedure in accordance with the provisions of the Construction and Demolition Waste Management Rules, 2016."

In order to put curb on the un-authorisedly dumped waste, it is essential to control it by asking ward Maintenance department or any MCGM department to issue work-permission only after assessing the total estimated quantity of C&D waste likely to be generated out of the repairs / construction / trenching work or any such civil works, and asking them to make payment in advance or in stages of waste generation for the 'Debris on Call' system or transport C&D waste to designated unloading site.

Following standard operating procedure is proposed to be adopted:

- 1) MCGM department like A. E. (Maintenance), A. E. (B&F), H.E., S.O., S.P., M.S.D.P., W.S.P., S.W.D., S.W.M., C.E., B.C., B.M., Roads, Bridges, etc. carrying out civil work / repairs works etc. shall put condition in the tender / quotation / work order to dispose of C&D waste generated either by (i) 'Debris on Call' scheme if generation of C&D waste is less than 300MT for entire project or (ii) contractor shall transport to designated unloading site approved by MCGM S.W.M. department by following due procedure if C&D waste is more than 300MT for entire project.
- 2) The estimated quantity of the C&D waste generated shall be certified by A.E. (Maintenance) Ward or the concerned department.
- 3) If quantity of C&D waste is less than 300MT, A. E. (S.W.M.) Ward will issue Challan for making payment as per 'Debris on call' scheme on approval from Zonal Ex. Eng. (S.W.M.).
- 4) If quantity of C&D waste is more than 300MT, the contractor / agency will submit C&D waste management plan complete with requisite documents to Zonal Ex. Eng. (S.W.M.). On approval, the contractor / citizen / agency carrying out the civil works will be allowed to transport the C&D waste material to the designated unloading site.
- 5) The contractor / citizen / agency carrying out the civil works shall maintain & submit the appropriate record like date, quantity of C&D waste transported, vehicle No., Challan of Receipt of C&D waste from unloading site etc.
- 6) The whole system of issuing NOC for C&D waste transportation and payment will be made ONLINE and for this M/S. Softtech will be asked to develop appropriate software on the basis of existing norms being done for auto-DCR portal.
- 7) The proposals will be processed manually till the complete system fully operational online.
- 8) All the contractors / agencies using designated unloading site must maintain proper record of the C&D waste generated and transported along with date and vehicles through which C&D is transported & the copies of Challans from unloading site for having unloaded the C&D waste and submit the same to A.E. (S.W.M.) ward through concerned department.

Sd/-07/08/2018
Ch. Eng. (S.W.M.)

Sd/-07/08/2018
D.M.C. (S.W.M.)

Sd/-10/08/2018
A.M.C.(E.S.)

Sd/-29/08/2018
Municipal Commissioner

Ch Eng (SP) Submitted, please.

Dy. Ch. Eng (S.W.M.)

D:\Online C&D Details\Unauthorised C&D waste.docx

50

MUNICIPAL CORPORATION OF GREATER MUMBAI

No. : MGC/F/6565 dtd. 25-9-2018

CIRCULAR

Sub : Setting up the parameters of litigation history of the bidders

As approved by Hon'ble M.C., the clause of litigation history be included as part of SBD as below :-

- 1) The bidder shall disclose the litigation history in Packet 'B' under the head "Details of Litigation History".

If there is no Litigation History, the bidder shall specifically mention that there is no Litigation History against him as per the clause of Litigation History. In case there is Litigation History -

Litigation History must cover - Any action of blacklisting, debarring, banning, suspension, deregistration and cheating with MCGM, State Govt., Central Govt. or any authority under State or Central Govt./Govt. organisation initiated against the company, firm, directors, partners or authorized signatory shall be disclosed for last 5 years from the date of submission of bid. Also, bidder must disclose the litigation history for last 5 years from the date of submission of bid about any action like show cause issued, blacklisting, debarring, banning, suspension, deregistration and cheating with MCGM and MCGM is party in the litigation against the company, firm, directors, partners or authorized signatory for carrying out any work for MCGM by any authority of MCGM and the orders passed by the competent authority or by any Court where MCGM is a party. While taking decision on litigation history, the concerned Chief Engineer or D.M.C. or Director, as may be the case, should consider the details submitted by bidder and take decision based on the gravity of the litigation and the adverse effect of the act of company, firm, directors, partners or authorized signatory on the MCGM works which can spoil the quality, output, delivery of any goods or any work execution and within the timeframe.

- 2) The litigation history shall be treated as curable defect and hence, the portion/clause of SBD, (C) Bid Capacity at Pg. 15 & in the chapter of 'Instructions to Applicants' at Pg. 31 of the SBD will be now corrected by deleting the word litigation history and shall be read as below.

C) Bid Capacity :

The bid capacity of the prospective bidders will be calculated as under: Assessed Available Bid Capacity = $(A * N * 2 - B)$

Where,

- A = Maximum value of Civil Engineering works executed in any one year (year means Financial year) during the last five years (updated to the price level of the Financial year in which bids are received at a rate of 10% per year) taking into account the completed as well as works in progress.
- N = Number of years prescribed for completion of the Project/Works, excluding monsoon period, for which these bids are being invited. (E.g. 7 months = 7/12 year). For every intervening monsoon, 0.33 shall be added to N.
- B = Value of existing commitments (only allotted works) on the last date of submission of bids as per bidding document and on-going works to be completed during the period of completion of the Project/Works for which these bids are being invited.

Note: The statement showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be attached along with certificates duly signed by the Engineer-in Charge, not below the rank of an Executive Engineer or equivalent.

Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- made misleading or false representation in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- Record for poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc."

All the concerned are directed to implement the above directions with immediate effect.

No. Dir./ES&P/915/MC
27.9.18

27/9/18
Director (E. S. & P.)

City Engineer/Ch.Eng.(Roads & Traffic) / Ch.Eng. (Bridges) / H. E. / Ch.Eng. (WSP) / Ch.Eng.(S.P.) / Ch.Eng.(S.O.)/ Ch.Eng.(MSDP) / Ch.Eng. (BM) / Ch.Eng.(Vig) / Ch.Eng. (M&E) / Ch.Eng.(D.P.)/Ch.Eng.(SWD) / Ch.Eng. (Coastal Road) / Ch.Eng.(SWM) / Ch.Eng.(CTIRC)/Dv. Ch.Eng.(HIC) / Dv.Ch.Eng.(SIC), Supt. of Garder s/

Asstt. Comm. Ward / Asstt. Comm.(Markets) / Asstt. Comm. (Estate) / Asstt. Comm.(Planning) / Asstt. Comm.(R.E.) City/W.S./E.S.

(S)
पुणेमुंबई महानगरपालिका प्रमुख अि यंता
मलनि:सारण प्रकल्प यंदि कार्यालय
वरळी. 5164/8.
29 SEP 2018
क्र. प्र. अ. (म. प्र.)
उप. प्र. अ. (म. प्र.) नि.प्र.सं. वि.ने.वांघ.
प्र.प्र. अ. (म. प्र.) आर.था
कर्म अ. (म. प्र.) मा.प.का

DY. Ch. E. (S.P.) Const/P&D
A.O.(S.P.(G)/Const/P&D
do justice
useful
Mu fiske 29/9
Chief Engineer
(Swe. Project)

- EE (SP)P&D - City/ES/WS/Micro
- A. O. (SP) - General/Esti/Const/P&D
- 1. Put Compliance
- 2. P
- 3. For Nil
- 4. Please Circulate

All to note & instruct
concerned staff accordingly
31/10/18
Dy. Ch.E(SP)P&D

Sodaye
This be the part
of tender document
31/10/18

MUNICIPAL CORPORATION OF GREATER MUMBAI
CIRCULAR

No.CA (F)/Project/31 Dt. 26/10/2020.

Subject: - Revised Policy for Governing Extra-excess-saving

Ref:- 1. Circular No.CA/FRD/1/57 dt.13.03.2013.
2. Circular No. Dir/E.S.&P./324 dt.15.07.2015.

At present the extra/excess/saving proposals are dealt as per Decision Rules framed under circular No.CA/FRD/1/57 of 13.03.2013 &Dir/E.S.&P./324 dt.15.07.2015.

Hon'ble M.C. has directed to review the existing Decision Rules and amend it suitably. Accordingly, in view to exercising effective control over the extra/excess and speedy process of such proposal during execution of the work, the powers of approval of extra/excess /saving and Fair items are reviewed and delegated according to the attached modified statement-"A". Except this, other conditions of Circular No. DIR./E.S.&P./324 dt.15.07.2015 shall remain unchanged and will be applicable as it is.

The "Decision Rules" framed and circulated apropos circular No.CA/FRD/1/57 of 13.03.2013 and Dir/ES&P/324 of 15.07.2015 shall remain applicable for those extra/excess works which were executed before issuance of these amended rules/directives by obtaining prior administrative approval of competent authority, as the case may be.

The revised policy for governing Extra/Excess and Fair items will come into effect immediately from the issuance of this circular.

All Chief Engineers/ Head of Departments/Deans shall note the above directives and follow them scrupulously.

Sd/- 13.10.2020
C. A. (WSSD)

Sd/- 13.10.2020
C. A. (Finance)l.c.

Sd/- 13.10.2020
D.M.C. (Infra)

Sd/- 13.10.2020
D.M.C.(E.)

Sd/- 14.10.2020
D.M.C.(S.E.)

Sd/- 13.10.2020
Dir.(E.S.&P.)

Sd/- 16.10.2020
A.M.C. (Project)

Sd/- 23.10.2020
Municipal Commissioner

Statement - A

(i) Extra/Excess/Saving

Permissible limit of Extra/Excess/Saving and Approving authority

Nature of work	DMC(Ia/ra)/ DMC(E)/ DMC(SE)/ Dir(ES&P) Jt.M.C.	Concerned A.M.C.	Municipal Commissioner
General Work/ Underground works/ Unforeseen works	(i) <u>Cumulative</u> amount of Extra/Excess/Saving in any <u>individual item</u> Upto Rs.25 Lakh And (ii) Total <u>Cumulative</u> amount of Extra/Excess/Saving <u>on all items</u> upto 5% of the total contract cost, but not exceeding Rs.1 crore	(i) <u>Cumulative</u> amount of Extra/Excess/Saving in any <u>individual item</u> Upto Rs.1 crore And (ii) Total <u>Cumulative</u> amount of Extra/Excess/Saving <u>on all items</u> upto 15 % of the total contract cost, but not exceeding Rs.10 crore	(i) <u>Cumulative</u> amount of Extra/Excess/Saving in any <u>individual item</u> above Rs.1Crore And / OR (ii) Total <u>Cumulative</u> amount of Extra/Excess/Saving <u>on all items</u> above 15% of the total contract cost. And / OR <u>Cumulative</u> amount of Extra/Excess/Saving <u>on all items</u> exceeding Rs.10 Crores.

Payment Terms:

Excess Items shall be paid as per the rates quoted by the tenderer at the time of tender

Extra Items shall be paid as per the rate prevailing in "Unified Schedule of Rate" of MCGM at the time of tender at rebate quoted by the contractor or at Par in case of premium quoted by the contractor at the time of tender

(ii) Fair Item

Nature of work	Permissible limit of Fair Item and Approving authority		
	DMC(Infray) DMC(E)/ DMC(SE) Dir(ES&P)/ Jt.M.C.	Concerned A.M.C.	Municipal Commissioner
For all nature of work	Total <u>Cumulative</u> amount of Fair <u>on all items</u> upto 2% of the total contract cost, but not exceeds Rs.20 Lakh	Total <u>Cumulative</u> amount of Fair <u>on all items</u> upto 5 % of the total contract cost, but not exceeds Rs.1 crore (Other than the proposals in the purview of DMC/Jt.MC)	Total <u>Cumulative</u> amount of Fair <u>on all items</u> above 5% of the total contract cost. And / OR <u>Cumulative</u> amount of Fair <u>on all items</u> exceeding Rs.1 Crore.

Payment Terms:

Fair Items shall be got approved by the concerned DMC/Dir(ES&P)/Jt.M.C. The engineer in-charge shall work out these fair items at fair and reasonable market rates on the basis of material, labour and operation of construction equipment required to execute the item and allowing 1.5% to cover profits and overhead charges(i.e. including taxes, duties, etc.) On the same lines of rate analysis prepared for the items that are in "Unified Schedule of Rate" of MCGM.

The rates of Fair Items shall be valid for one year only. Moreover, no escalation will be admissible on the fair items till the completion of such works, in which the fair items are executed.

Fair Items shall be paid at PAR in case of premium quoted by the contractor, in newly created FAIR ITEM or item not included in prevailing "Unified Schedule of Rate" of MCGM at the time of tender. OR at rebate quoted by the contractor if it is already added in prevailing "Unified Schedule of Rate" of MCGM at the time of tender.

Sd/- 13.10.2020 Sd/- 13.10.2020 Sd/- 13.10.2020 Sd/- 13.10.2020 Sd/- 13.10.2020
C. A. (WSSD) C. A. (Finance) i.c. D.M.C. (Infra) D.M.C.(E.) D.M.C.(S.E.) Dir.(E.S.&P.)

5

MUNICIPAL CORPORATION OF GREATER MUMBAI

Office of the DMC CPD,
Central Purchase Department,
566, N.M.Joshi Marg, Byculla, Mumbai-400 011.

✓ No. DyChE/ CPD/ 2025 / dt. 01/09/2021

CIRULAR

Sub: Formation of Grievance Redressal Committee (GRC)
to address grievances from bidders.

Ref.: MGC/F/4961 dated 09/08/2021.

Hon. M.C.'s accorded sanction under reference to form Grievance Redressal Committee (GRC) to address grievances from the bidders regarding responsiveness/ non-responsiveness in Packets 'A', 'B' or 'C' in all the tenders. Therefore, all HOD's are requested to incorporate following condition in all the tenders;

Grievance Redressal Committee (GRC)

1. *If a Bidder is not satisfied with the decision of responsiveness/ non responsiveness in Packets 'A', 'B' or 'C', by the concerned HOD, he may appeal to D.M.C. (C.P.D.) by paying fee of Rs. 25,000/-.*
2. *D.M.C. (C.P.D.) will assign the work of co-ordination of various activities and administration work of G.C.R. to nominated Registrar – Shri. Uday B. Mande.*
3. *The Committee for hearing grievances and passing orders will be constituted as follows:*
 - (a) *The Committee will comprise of D.M.C. / Director / Jt.M.C. of tender inviting department and D.M.C. / Director / Jt.M.C. of the department for which tender is being invited.*

For example, if tender is invited by C.P.D. dept, for K.E.M. Hospital then the Committee will be of DMC(CPD) and DMC (PH).

- (b) *In case the tender inviting department and department for which tender is being invited are same then the concerned DMC/ Director/ Jt.M.C. of the same department and DMC(CPD) will be the members of the Committee.*

For example, if tender is invited by Dean (KEM) for KEM Hospital then the Committee will be DMC (PH) and DMC(CPD).

In tabular format:

Tender inviting Department	Work belonging Department
<i>DMC(CPD) or DMC /Director / Jt.M.C. of concerned Department.</i>	<i>Concerned DMC / Director/ Jt.M.C.</i>

4. *In case the work is pertaining to various departments then concerned DMC / Director/ Jt.M.C. having major contribution of work will be one of the member of the Committee.*
5. *The Committee will hear the grievances of bidder within 30 days on receipt of bidder's application and will pass an order within 45 days.*
6. *If Bidder is not satisfied with the decision of the above Committee, he may appeal to the concerned Addl. Municipal Commissioner of Tender Inviting Department. The Addl. Municipal Commissioner will hear the case within 45 days from the date of receipt of application for second appeal from the bidder and will pass the order within 60 days.*


Sd/- 27.07.2021
Dy ChE (Civil) CPD

sd/- 27.07.2021
D.M.C. (C.P.D.)

Sd/- 30.07.2021
A.M.C. (WS)

sd/- 06.08.2021
Hon,ble M. C.

The above circular approved by Hon,ble MC is submitted for necessary action please.


01/09/2021
Dy ChE (CPD) Civil

SECTION - 7
SCOPE OF WORK

SCOPE OF WORK

This special work has following Scope of work:

The Permanent Works under this contract shall include but not be limited to the following:

- a) Design, manufacture and supply of HDPE pipe (PN-6 Class- PE 80 grade: IS 14333) or other suitable pipes (HD Pipes) RC NP 3 pipes as approved by the Engineer of various diameters.
- b) Excavation of jacking & receiving shafts including utility shifting, proper barricading as per circular No.MGC/F/6342 dated 5.5.2018 with adequate reflectors including shoring/Sheet piling/RCC meter piling, soil stabilization/Rock anchoring etc.
- c) Boring tunnel by laser guided Microtunneling machine (slurry shield) / HD Machine / Manual boring Machine in any type of ground. (i.e soft soil, murum, with boulders, extra ordinary hard rock having at least UCS 250 MPa, varying ground condition, mixed face condition etc.)
- d) Work by HDD method, in any type of ground (i.e soft soil, murum, with boulders, extra ordinary hard rock having at least UCS 250 MPa, varying ground condition, mixed face condition etc.)
- e) The complete installation of reinforced cement concrete pipeline pipes or other HD pipes by Microtunneling/HDD(Horizontal Directional drilling) & pipe jacking method, including fittings or specials as specified and as approved by the Engineer.
- f) The constructions of Roboholes, special chambers, drop arrangements pipes, vent shafts, cross connections to existing sewer line at every junction etc. complete.
- g) CCTV surveying, Hydraulic Testing under supervision of the BMC's user department's staff and handing over to that department upon successful testing.
- h) Transferring of existing working connections & providing new connections by appropriate enabling arrangements without unduly affecting the functioning of the existing sewer. The work may require trenchless technology/ Microtunneling or convention open excavation for laying such connections.

- i) Reinstatement of trenches & road resurfaces as per BMC Guidelines, MORTH specifications etc.
- j) Ancillary and incidental works and all necessary works required to complete the work successfully and to entire satisfaction to the Engineer.
- k) The work will have to be done in a planned manner so that sewage flow is not disrupted even partially for more than 24 hours.
- l) The locations of installations of sewer lines are across and along narrow and busy roads. The contractor shall provide proper safety precautions on work sites including proper MS or suitable barricading as per circular No.MGC/F/6342 dated 5.5.2018 of pit/ trenches, providing adequate reflectors on barricades, pedestrian safety etc. to ensure that no accidents / mishaps occurs at sites. Locations, if any across railway, no open excavations within railway compounds would be permitted.
- m) Any type of utility detection and avoidance/ protection during execution.
- n) Rectification of any damage caused to adjoining structures
- o) Management of excavated material
- p) Submission of as-built drawings (Soft copy and hard copies as required by the Engineer) including updating the records in SUMC of BMC
- q) Handing over the completed works to Sewerage Operations Department
- r) Insurance of the works, Third Party and Workmen as per the contractual obligations
- s) Any temporary or enabling arrangements necessary for construction, testing and commissioning of the completed works and conducting the tests on completed works.
- t) Detailed Survey by **Total station**,
- u) Excavations in all types of soil / rock/ Asphalt layers/ Paver Block,
- v) Providing shoring the trenches,
- w) Providing and Laying rubble Soling and PCC,
- x) Providing and Laying Stoneware and / or HDPE pipe (PN-6 Class- PE 80 grade : IS 14333) Class pipes ,

- y) Providing and Laying P-1 Class pipes or any other pipes as directed,
- z) Providing M-15 Grade Concrete Encasement,
- aa) Leaving shoring in trenches and Filling in Trenches,

Note:

- 1) The work contained in the scope of work shall be carried out strictly as per the relevant specifications applicable as attached or referred to in this e -tender document.
- 2) The above is general description of the scope of work & actual work shall be governed by B.O.Q. and as directed by the Engineer.
- 3) If there are multiple works under this e – tender / contract, the work should be carried out by Phase wise program / designed milestone and as per priority.
- 4) Applicable BMC's USOR:

The new Unified Schedule of Rates of S.P Department & USOR-2018 for other Departments are applicable which are available on M.C.G.M portal: <http://portal.mcgm.gov.in>.

PRINT COPY

SECTION - 8

BILL OF QUANTITIES

Subject :P/L 400 mm dia. (OD) HDPE pipe sewer line (PN-6 Class- PE 80 grade : IS 14333) to correct grade and alignment on North side of JVLR from W.E.H. to Pratap Nagar, Jogeshwari(E) in K/E Ward by HDD method

S r. N o.	Sched ule Item No.	Description	Total Qty	Unit	Rate	Total Cost
1	R2- SE-1- 1	Excavation for foundations, substructures, basements, tanks, sumps, walls, chambers, manholes, trenches, poles, pits & general building works in all types of soils, vegetable earth, soft murum, running sand, shingle, turf clay, loam, peat, ash, shale, slag, chalk, garbage, muddy / marshy / slushy soil, marine clay, reclaimed land etc. for depths/lifts upto 1.5M measured from the ground level, including dressing/trimming the sides, leveling and ramming of bottoms, manual dewatering, removing rank vegetation, backfilling in layers not more than 200 mm thickness, watering, consolidating, compacting to achieve not less then 97% Modified Proctor density conforming to relevant I-S, stacking the selected material in measurable heaps for future use within owners space or disposing within an initial lead of 150 m as directed, loading, unloading, leveling excluding shoring, strutting etc. complete as directed by Engineer-in-Charge.Note: 1)The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc. 2) It also includes the royalty and other taxes applicable if any.	980.00	Cum	468.00	458640. 00
2	R2- SE-1- 1-a	do-do- as per item R2-SE-1-1 for lift from 2m to 4m.	390.00	Cum	638.00	248820. 00
3	R2- SE-1- 1-b	do-do- as per item R2-SE-1-1 for lift from 4m to 6m.	240.00	Cum	868.00	208320. 00
4	R2- SE-1- 1-c	do-do- as per item R2-SE-1-1 for lift from 6m to 8m.	30.00	Cum	1036.0 0	31080.0 0
5	R2- SE-1- 1-J	Extra over above for item no. R2-SE-1-1 to R2-SE-1-1-i for relevant lift of excavation in soft/ disintegrated rock, road carriageway,sand stone, stiff clay, gravel, cobblestone, hard laterite, water bound macadam, wet mix macadam, asphalt mix carpet of any type, pitching, soling, paths and hardcore, lime concrete, plain cement concrete, stone masonry and all types of brick/ block masonry below ground level	520.00	Cum	429.00	223080. 00
6	R2- SE-1- 1-u	Extra over above for item no.R2-SE-1-1 toR2-SE-1-1-i for relevant lift of excavation in hard rock and reinforced concrete by chiseling for sewerage works by manual operations, pneumatic breaker, hammer, driller, compress or breaker, etc. including dressing/trimming the sides, leveling of bottoms,	330.00	Cum	2100.0 0	693000. 00
7	R2- SE-1- 1-ae	Do. -- by Splitter Machine.	330.00	Cum	4970.0 0	1640100 .00

8	R2-SE-1-4-a	Providing and removing close shoring and strutting in the trenches/ pits for all depths as per specifications/ drawings and or as directed by Engineer-in-charge by including walling, struts, open poling boards, horizontal sheeting, runners, dog spikes by using timber etc. complete.	40.00	Cum	8586.00	343440.00
9	R2-SE-1-5-a	Leaving shoring in trenches. (New or old) including dog spikes.	10.00	Cum	15561.00	155610.00
10	R2-SE-2-1	Providing & laying M 10 c.c. For foundation/bedding including boxing, curing etc. complete as specified and as directed.	10.00	Cum	6122.00	61220.00
11	R2-SE-2-5	-do- -do- M 15 c.c. For full encasement or cradle -do- -do-	50.00	Cum	7354.00	367700.00
12	CS-MW-1-b	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in: Cement mortar 1:4 (1 cement : 4 coarse sand)	10.00	Cum	5807.00	58070.00
13	CS-MW-1-c	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in: Cement mortar 1:3 (1 cement : 3 coarse sand)	10.00	Cum	5584.00	55840.00
14	CS-MW-18	Uncoursed rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20mm nominal size) upto plinth level in 1:6 cement mortar	10.00	Cum	4326.00	43260.00
15	R2-SE-4-3	Providing 20 mm thick cement plaster in cement mortar 1:2 including neat cement rendering. (without water proofing compound)	10.00	Sq.m	376.00	3760.00
16	R2-SE-4-9	Providing 20 mm thick cement plaster in cement mortar 1:1 including neat cement rendering.(without water proofing compound).	10.00	Sq.m	436.00	4360.00
17	R2-SE-14-3-c	Providing, Laying and Jointing of 400mm dia (OD) HDPE pipe (PN 6 Class-PE 80 grade: IS 14333) to correct grade and alignment from 5m upto 8m depth including boring, Pilot inclined dilling from existng ground level upto required depth (invert level) on rig side of proposed gravity sewer line (i.e. entry side) and Final inclined boring from existng ground level upto required depth (invert level) or viceversa on pipe side (i.e. exit side) of proposed gravity sewer line using Horizontal Directional Drilling method in any type of ground including soft soil, mixed ground and soft/hard rock. Length of gravity sewer line between inner faces of two consecutive proposed	430.00	m	64646.00	2779778.00

		manholes will be considered for measurement.				
18	R2-SE-5-2-a	Providing & laying 150mm dia. stoneware pipes of SP2 class including jointing	190.00	m	523.00	99370.00
19	CS-PS-163-b	Providing, laying and jointing glazed stoneware pipes class SP-1 with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete :150 mm diameter (for vent shaft)	30.00	m	460.00	13800.00
20	R2-SE-6-2-b	Constructing on sewer brick masonry conical manhole 1.5 M. dia. at bottom and 0.56M dia. at top including C.I. Extra. Heavy Duty circular air tight frame and cover etc. complete as per description in item No. R2-SE-6-1 depth upto 2.3M.	17.00	no.	90305.00	1535185.00
21	R2-SE-6-2-c	Extra for above manhole per metre depth above 2.3M and upto 5M including safety chain and extra C.I steps on otherside of benching-do-do-	38.00	m.depth	34099.00	1295762.00
22	R2-SE-6-2-d	Do -do- above 5 M & upto 9 M -do- -do-	4.00	m.depth	48097.00	192388.00
23	R2-SE-6-8	Constructing on sewer brick masonry scraper manhole 1.5M x 1.5 M at bottom and 1.2 M x 0.9M at top, including C.I. EHD airtight rectangular frame and cover weighing minimum 900 kg . complete as per description in Item No.SE-6-1 depth 2.9 M	3.00	no.	226634.00	679902.00
24	R2-SE-6-8-a	Extra for above manhole per metre depth above 2.9M and upto 5 M including safety chain and extra C.I steps on other side of benching-dodo m	7.00	m.depth	40863.00	286041.00
25	R2-SE-6-8-b	Do -do- above 5 M depth and upto 9 M depth -do- -do-	2.00	m.depth	59228.00	118456.00
26	R2-SE-7-1	Providing 150mm dia stone ware pipes of SP2 class invertical drop of 0.6 Mincluding 150mm dia stoneware pipe fixed in brick masonry of the manhole at required level & providing 150mm dia stoneware right angled bend, 150mm x 150mm x 150mm S.W.double tee junction including cutting, jointing & illeting as per detailed specifications, encased in half brick thick masonry incement mortar(1:3) all round the pipes double tee ,bend and extra brick work below bend up to the foundation of the manhole and tapering portion of the manhole, plastering the exposed surfaces after raking out the joints of the masonry to a depth of 20mm in C.M.(1:2)20mm thick and neat cement rendering so as to give a smooth surface, including plugging the openings etc.complete as directed and as per drawing in Dy.Ch.E.(S.P.)P&D's office.	19.00	no.	4220.00	80180.00
27	R2-SE-7-1-a	Extra over above per additional metre depth-do--do- as per above item.	55.00	m.depth	3234.00	177870.00

28	R2-SE-8-1	Constructing brick masonry inspection chamber rectangular 0.9M x 0.45M and 0.6M deep on sewer with 230mm brickwalls in cement mortar 1:3 plastered both inside & outside with 20 mm thick cement mortar 1:2 and neat cement rendering so as to give a smooth surface including 230mm cement concrete bedding (M 15) and cement concrete (M 15) in haunches and channels finished smooth with 20 mm thick cement mortar(1:1) and fixing C.I. extra heavy duty airtight rectangular frame & cover of size 0.9M x 0.45M weighing minimum 225Kg. resting on 300 mm high c.c. cap M 20 with(1:1) cement plaster on both the sides & necessary C.I. steps (weighing 5.4 kg each) staggered at 300mm c/c. including 75 mm wide vata all round the external portion of the chamber and the foundation concrete in C.M. 1:1 etc. complete as per plan in Dy.Ch.E.(SP)P&D's office(without excavation).	19.00	No	40697.00	773243.00
29	R2-SE-8-1-a	Extra over above for every additional metre depth upto 2.5M-do--do-etc. complete as specified and directed.	27.00	m.depth	13531.00	365337.00
30	R2-SE-9-1	Providing R.C.C. Spun vent shaft 7.3M in height embedded in M15 cement concrete Including flue chamber etc.complete without excavation.The height of the vent shaft to be measured from its bottom upto the top as per the drawing and as specified and directed	3.00	No	52114.00	156342.00
31	R2-SE-12-15	Extra for providing locking arrangement to C.I. EHD Circular manhole frame and cover above the rate of providing and fixing C.I. EHD Circular manhole frame and cover.	14.00	No	1038.00	14532.00
32	R2-RW-1-18	Levelling, watering & rolling by vibratory roller IDD-22 weighing not less than 10 tonnes & preparing the ground to the required grade & camber (only to be used for reinstatement for trench in road work) as per New Road Specifications.	250.00	Sq.m	19.00	4750.00
33	R2-RW-10-28	Supply & filling sand, metal GRAVELLY SAND Corresponded to CLASS II/ CLASS III GRADING of TABLE 100.1of new road specifications-2006 in trenches upto required depth & watering, ramming etc. complete as directed	180.00	Sq.M	1905.00	342900.00
34	R2-RW-2-21	Providing & laying, spreading & compacting specified crushed stone in granular subbase course including premixing the material in mechanical mixer (pug mill or approved type), spreading of mixed material in uniform layer of 100mm to 75mm (compacted thickness each) with motor grader or paver on prepared murum surface & compacting with 10 tonne vibratory roller to achieve desired density including all material, labour, machinery, lighting barricading to all lifts & lead maintenance of diversion etc. complete (metal gradation from 90mm to 75mm micron as per MCGM Road Specifications clause no.210).	50.00	Cu.M	2547.00	127350.00
35	R2-RW-2-22	Rebate for not using motor grader / paver for laying of Granular Sub base in RW-2-21	50.00	Cu.M	-93.00	-4650.00

36	R2-RW-20	Providing & laying, spreading & compacting graded crushed stone aggregate to wet mix macadam satisfaction including premixing the material with water to OMC in mechanical mix (pugmill) carriage of mix material by tipper to site laying in uniform layer of 75mm to 100mm (compacted thickness each) with sensor paver finisher on prepared subbase & compacting with vibratory roller (10tonne) to achieve desired density including lighting,guarding barricating & maintenance of diversion etc. as directed by the Engineer, (Rebate for not using sensor paver should be taken, (metal gradation from 53mm to75mm micron as per MCGM Road Specifications clause no.240).	110.00	Cu. M	2937.00	323070.00
37	R2-SWD-15-A	Providing and laying RMC (Ready Mixed Concrete) M-15	10.00	Cu. M	6764.00	67640.00
38	R2-SWD-35	Cutting down existing cement / lime concrete works by any means in pavement, bedding below foundation, coping, walls arches, stone, brick pavement coping etc. of any thickness of any height / depth above or below ground level etc.complete, as specified & as directed by Engineer in Charge.	10.00	Cu. M	1314.00	13140.00
39	R2-SWD-36	Cutting down completely RCC slab, walls, beams,columns, arches, piles, pile caps of any thickness and or size of any height / depth by any means below or above ground level including cutting down steel reinforcement, removing and stacking them properly as directed etc.complete, as specified & as directed by Engineer in Charge.	10.00	Cu. M	1588.00	15880.00
40	R2-SWD-178	Providing & placing in position controlled Ready Mix Concrete of grade M- 40 in raft slab by using Ordinary Portland Cement including transportation to site anywhere in Mumbai including curing by any means etc. complete as directed by Engineer in Charge. (Reinforcement & Formwork shall be paid separately).	10.00	Cu. M	7777.00	77770.00
41	R2-SWD-179	Providing & placing in position controlled Ready Mix Concrete of grade M- 40 in walls and deck slab above or below ground level at any height / depth by using Ordinary Portland Cement including Transportation anywhere in Mumbai including curing by any means etc complete as directed by Engineer in Charge. (Reinforcement & Formwork shall be paid separately).	10.00	Cu. M	9569.00	95690.00
42	R2-SE-7-11	Do- -do- 400 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 1.2M -do- -do- as in item No.SE-7-4	6.00	No.	63971.00	383826.00

4 3	R2- RW- 10-32	Providing and laying Dry Lean Concrete base including providing coarse and fine aggregate to the specified gradation using minimum cement content 150 kg/cum of concrete with OPC 43 grade cement, mixing of concrete as per approved design mix using mechanised batch mix plant of appropriate capacity, transporting and laying with self propelled paver with electronic sensor device and compacting with vibratory roller of minimum 80- 100 KN static weight to give desired compacted density and average compressive strength of 10 MPa at 7 days and curing with liquid curing compound and sprinkling water and covering with moist hessian cloth or ponding of water for 7 days including providing construction joints, including all material, labour, machinery with all leads and lifts etc. complete as specified and as directed by the Engineer. B) Laying by paver with electronic sensor device.	70.00	Cu. M	4481.0 0	313670. 00
4 4	R2- RW- 10-33	Providing & laying M-40 C.C.avg. compressive strength 45 MPa and avg. flexural strength of 5.0 MPa (As per IRC 15-2002.N.1.6) procured from M.C.G.M. approved R.M.C. plant including use of approved make of plasticizer/ retarder & Contractor's water with ice flakes and transported by transit mixer and placing at work site. Compacting, finishing, initial curing by approved curing compound & Contractor's water and tarring the sides of slab with hot bitumen as specified and directed (w/c ratio 0.4 maximum)(vata for curring will be paid separately.) (MINIMUM CEMENT CONTENT 350 kg/m ³)	140.00	Cu. M	7968.0 0	111520 .00
4 5	R2- RW- 10-16	Providing & fixing in position mild steel tie bars of 12 mm dia 55 cm long & 45 cm C/C whenever directed including handling, wrapping with paper for half length, fixing, straightening, wastage etc. complete in all respect as directed.	0.30	MT	63226. 00	18967.8 0
4 6	R2- RW- 10-17	Providing & fixing in position M.S. dowel bars of 32mm dia 55 cm long & 30 cm C/C whenever directed including handling, fixing, etc. complete(no extra payment will be made for applying bitumen & grease to dowel bars).	0.20	MT	62904. 00	12580.8 0
4 7	R2- CS- CW- 35-b	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps footings,raft,retaining wall,shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc. as per detailed designs, drawings and bar bending schedules,including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc. all complete at all levels FE 415 HYSD bars	6.00	MT	73279. 00	439674. 00
4 8	R2- RW- 10-55	Excavation in Reinforced OR pavement grade concrete M-20 & above by using modern machinery (poclain with rock breaker, etc.) including with stacking of excavated material within 150 m radius etc complete upto any depth as specified & as directed, by the Engineer.	140.00	cum	1525	213500. 00

49	R2-HE-8-27-a	Cutting of exsisting cement concrete road upto specified depth by using Diamond Saw machine etc. complete in all respects and as directed by Engineer In Charge. Note : The charges for supplying water and electricity are exclusive of the rate worked out.	800.00	Rmt	1486.00	118880.00
50	R2-SE-12-13	Pumping out water from drainage trenches by 5H.P. pump per shift of 8 hours.	50.00	per shift	1995	99750
51	R2-SE-12-14	do--do- 10 H.P. -do- -do-	50.00	per shift	2394	119700

Total Estimated cost	Rs.	43152016.60
----------------------	-----	--------------------

		43152100.00
--	--	--------------------

Say	Rs.	4,31,52,100.00
-----	-----	-----------------------

SECTION- 9

GENERAL CONDITIONS OF CONTRACT

General Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

The “Contract” shall mean the tender and acceptance thereof and the formal agreement if any, executed between the Contractor, Commissioner and the Corporation together with the documents referred to therein including these conditions and appendices and any special conditions, the specifications, designs, drawings, price schedules, bills of quantities and schedule of rates. All these documents taken together shall be deemed to form one Contract and shall be complementary to one another.

The Contract Data defines the documents and other information which comprise the Contract.

The “Contractor” shall mean the individual or firm or company whether incorporated or not, whose tender has been accepted by the employer and the legal successor of the individual or firm or company, but not (except with the consent of the Employer) any assignee of such person.

The Bidder is a person or corporate body who has desired to submit Bid to carry out the Works, including routine maintenance till the tender process is concluded.

The Contractor's Bid is the completed bidding document submitted by the Contractor to the Employer.

The “Contract Sum” means the sum named in the letter of acceptance including Physical contingencies subject to such addition thereto or deduction there-from as may be made under the provisions hereinafter contained.

Note: The contract sum shall include the following –

- In the case of percentage rate contracts the estimated value of works as mentioned in the tender adjusted by the Contractor’s percentage.
- In the case of item rate contracts, the cost of the work arrived at after finalisation of the quantities shown in schedule of items / quantities by the item rates quoted by the tenderers for various items and summation of the extended cost of each item.
- In case of lumpsum contract, the sum for which tender is accepted.

- Special discount / rebate / trade discount offered by the tenderer if any and accepted by the Corporation.
- Additions or deletions that are accepted after opening of the tenders.

The “Contract Cost” means the Contract Sum plus Price Variation. This cost shall be included in the letter of acceptance.

A Defect is any part of the Works not completed in accordance with the Contract.

The Defects Liability Certificate is the certificate issued by the Engineer, after the Defect Liability Period has ended and upon correction of Defects by the Contractor.

Drawings means all the drawings, calculations and technical information of a like nature provided by the Engineer to the Contractor under the Contract and all drawings, calculations, samples, patterns, models, operation & maintenance manual and other technical information of like nature submitted by the Contractor and approved by the Engineer.

The Authority shall mean Municipal Corporation of Greater Mumbai (BMC)

The “Employer” shall mean the Municipal Corporation for Greater Mumbai / Municipal Commissioner for Greater Mumbai, for the time being holding the said office and also his successors and shall also include all “Additional Municipal Commissioners, Director (Engineering Services & Projects)” and the Deputy Municipal Commissioner, to whom the powers of Municipal Commissioner, have been deputed under Section 56 and 56B of the Mumbai Municipal Corporation Act.

The Engineer in-charge shall mean the Executive Engineer in executive charge of the works and shall include the superior officers of the Engineering department i.e. Dy.Ch.Eng/Ch.Eng. and shall mean and include all the successors in BMC

The Engineer's Representative shall mean the Assistant Engineer, Sub. Engineer/Jr. Engineer in direct charge of the works and shall include Sub Eng./ Jr. Eng of Civil section/ Mechanical section/ Electrical section appointed by BMC.

The “Engineer” shall mean the City Engineer / the Hydraulic Engineer / the Chief Engineer / the Special Engineer, appointed for the time being or any other officer or officers of the Municipal Corporation who may be authorized by the commissioner to carry out the functions of the City Engineer / the Hydraulic Engineer / the Chief Engineer / the Special Engineer or any other competent person appointed by the employer and notified in writing to the Contractor to act in replacement of the Engineer from time to time.

Contractor's Equipment means all appliances and things of whatsoever nature required for the execution and completions of the Works and the remedying of any defects therein, but do not include plant material or other things intended to form or forming part of the Permanent Works.

The Initial Contract Price is the Contract Price listed in the Employer's Letter of Acceptance.

The Intended Completion Date is the date on which it is intended that the Contractor shall complete the construction works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time.

Materials are all supplies, including consumables, used by the Contractor for incorporation in the Works and works of routine maintenance.

Plant is any integral part of the Works that shall have a mechanical, electrical, electronic, chemical, or biological function.

Routine Maintenance is the maintenance of activities of the completed structure for five years as specified in the Contract Data.

The "Site" shall mean the land and other places including water bodies more specifically mentioned in the special conditions of the tender, on, under in or through which the permanent works or temporary works are to be executed and any other lands and places provided by the Municipal Corporation for working space or any other purpose as may be specifically designated in the contract as forming part of the site.

Site Investigation Reports are those that were included in the bidding documents and are reports about the surface and subsurface conditions at the Site.

"Specification" shall mean the specification referred to in the tender and any modification thereof or addition or deduction thereto as may from time to time be furnished or approved in writing by the Engineer.

The Start Date/Commencement Date is given in the Contract Data. It is the date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

A Nominated Sub-Contractor is a person or corporate body who has a Contract with the Contractor to carry out a part of the construction work and/or routine maintenance in the Contract, which includes work on the Site.

Temporary Works are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.

Variation means a change to the:-

- i) Specification and /or Drawings (if any) which is instructed by the Employer.
- ii) Scope in the Contract which is instructed by the Employer.
- iii) Price in the Contract which is instructed by the Employer.

The Works, as defined in the Contract Data, are what the Contract requires the Contractor to construct, install, maintain, and turn over to the Employer. Routine maintenance is defined separately.

Jurisdiction: In case of any claim, dispute or difference arising in respect of a contract, the cause of action thereof shall be deemed to have arisen in Mumbai and all legal proceedings in respect of any claim, dispute or difference shall be instituted in a competent court in the City of Mumbai only.

2. Interpretation

- 2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about these Conditions of Contract.
- 2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
- 2.3 The documents forming the Contract shall be interpreted in the following documents: (1) Agreement, (2) Letter of Acceptance, (3) Notice to Proceed with the Work , (4) Contractor's Bid, (5) Contract Data, (6) Special Conditions of Contract Part (7) General Conditions of Contract Part I, (8) Specifications, (9) Drawings, (10) Bill of Quantities, and (11) Any other document listed in the Contract Data.

3. Engineer's Decisions

- 3.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer. However,

if the Engineer is required under the rules and regulations and orders of the Employer to obtain prior approval of some other authorities for specific actions, he will so obtain the approval, before communicating his decision to the Contractor.

3.2 Except as expressly stated in the Contract, the Engineer shall not have any authority to relieve the Contractor of any of his obligations under the contract.

4. Delegation

4.1 The Engineer, with the approval of the Employer, may delegate any of his duties and responsibilities to other person(s), except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.

5. Communications

All certificates, notices or instructions to be given to the Contractor by Employer/ Engineer shall be sent on the address or contact details given by the Contractor of Bid. The address and contact details for communication with the Employer/ Engineer shall be as per the details given in Contract Data. Communications between parties that are referred to in the conditions shall be in writing. The Notice sent by facsimile (fax) or other electronic means shall be effective on confirmation of the transmission. The Notice sent by Registered post or Speed post shall be effective on delivery or at the expiry of the normal delivery period as undertaken by the postal service.

6. Subcontracting

6.1 Unless specifically mentioned in the contract subletting will not be allowed. Subletting, where otherwise provided by the contract shall not be more than 25% of the contract price.

6.2 The Contractor shall not be required to obtain any consent from the Employer for:

- a. the sub-contracting of any part of the Works for which the Subcontractor is named in the Contract;
- b. the provision for labour, or labour component.
- c. the purchase of Materials which are in accordance with the standards specified in the Contract.

6.3 Beyond what has been stated in clauses 6.1 and 6.2, if the Contractor proposes sub contracting any part of the work during execution of the Works, because of some

unforeseen circumstances to enable him to complete the Works as per terms of the Contract, the Employer will consider the following before according approval:

- a. The Contractor shall not sub-contract the whole of the Works.
- b. The permitted subletting of work by the Contractor shall not establish any contractual relationship between the sub-contractor and the BMC and shall not relieve the Contractor of any responsibility under the Contract.

6.4 The Engineer should satisfy himself before recommending to the Employer whether

- a. the circumstances warrant such sub-contracting; and
- b. the sub-Contractor so proposed for the Work possesses the experience, qualifications and equipment necessary for the job proposed to be entrusted to him.

7. Other Contractors

7.1 The Contractor shall cooperate and share the Site with other Contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as referred to in the Contract Data. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.

7.2 The Contractor should take up the works in convenient reaches as decided by the Engineer to ensure there is least hindrance to the smooth flow and safety of traffic including movement of vehicles and equipment of other Contractors till the completion of the Works.

8. Personnel

8.1 The Contractor shall employ for the construction work and routine maintenance the key personnel including technical personnel named in the Contract Data or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of technical personnel only if their relevant qualifications and abilities are substantially equal to those of the personnel stated in the Contract Data.

8.2 The Contractor's personnel shall appropriately be qualified, skilled and experienced in their respective trades or occupations. The Engineer shall have authority to remove, or cause to be removed, any person employed on the site or works, who carries out

duties incompetently or negligently and persists in any conduct which is prejudicial to safety, health or the protection of the environment.

8.3 If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the Works in the Contract.

8.4 The Contractor shall not employ any retired Gazetted officer who has worked in the Engineering Department of the BMC /State Government and has either not completed two years after the date of retirement or has not obtained BMC/State Government's permission to employment with the Contractor.

9. Employer's and Contractor's Risks

The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

10. Employer's Risks

The Employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works in the Employer's country, the risks of war, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot, commotion or disorder (unless restricted to the Contractor's employees) and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive, or (b) a cause due solely to the design of the Works, other than the Contractor's design.

11. Contractor's Risks

All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks, referred to in clause 11.1, are the responsibility of the Contractor.

12. Insurance

12.1 The Contractor at his cost shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractor's risks:

a) Loss of or damage to the Works, Plant and Materials;

- b) Loss of or damage to Equipment;
- c) Loss of or damage to property (other than the Works, Plant, Materials, and Equipment) in connection with the Contract; and
- d) Personal injury or death.

12.2 Insurance policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

12.3 Alterations to the terms of insurance shall not be made without the approval of the Engineer.

12.4 Both parties shall comply with any conditions of the insurance policies.

12.5 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid, from payments otherwise due to the Contractor or if no payment is due, the payment of premiums shall be debt due.

13. Site Investigation Reports

The Contractor, in preparing the Bid, may rely, at his own risk, on any Site Investigation Reports referred to in the Contract Data, supplemented by any other information available to him, before submitting the bid.

14. Queries about the Contract Data

The Engineer will clarify queries on the Contract Data.

15. Contractor to Construct the Works and Undertake Maintenance (if specified in the tender)

15.1 The Contractor shall construct, and install and maintain the Works in accordance with the Specifications and Drawings and as per instructions of the Engineer.

15.2 The Contractor shall construct the works with intermediate technology, i.e., by manual means with medium input of machinery required to ensure the quality of works as per specifications. The Contractor shall deploy the equipment and machinery as required in the contract.

15.3 The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and byelaws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in future by the State or Central Government or the local authority. Salient features of some of the major laws that are applicable are given below:

The Water (Prevention and Control of Pollution) Act, 1974, this provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Air (Prevention and Control of Pollution) Act, 1981, this provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986, this provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as

hazardous substance under the Environment (Protection) Act 1986, and exceeding such quantity as may be specified by notification by the Central Government.

16. The Works and Routine Maintenance to be completed by the Intended Completion Date

16.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works and Routine Maintenance, if specified in the tender, in accordance with the Programme submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

17. Approval by the Engineer

17.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Engineer, who is to approve them if they comply with the Specifications and Drawings.

17.2 The Contractor shall be responsible for design and safety of Temporary Works.

17.3 The Engineer's approval shall not alter the Contractor's responsibility for design and safety of the Temporary Works.

17.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.

17.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

18. Safety

18.1 The Contractor shall be responsible for the safety of all activities on the Site. He shall comply with all applicable safety requirements and take care of safety of all persons entitled to be on the site and the works. He shall use reasonable efforts to keep the site and the works, both during construction and maintenance, clear of unnecessary obstruction so as to avoid danger to the persons and the users.

- Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.
- Stone breaker shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

- The area should be barricaded or cordoned off by suitable means to avoid mishaps of any kind. Power warning signs should be displayed for the safety of the public whenever cleaning works are undertaken during night or day.
- The workers engaged for cleaning the Roboholes/sewers should be properly trained before allowing working in the Robohole.

18.2 Safety Programs:-

- Have adequate safety supervision in place to ensure that safety programs set up by the firms/agencies are in compliance with prevalent laws and regulations.
- Review safety programs developed by each of the trade firms, prepare and submit a comprehensive safety program.
- Monitor day to day implementation of safety procedures

18.3 First Aid Facilities: -

- At every work place there shall be provided and maintained, so as to be easily accessible during working hours, first-aid boxes at the rate of not less than one box for 150 contract labour or part thereof ordinarily employed.
- The first-aid box shall be distinctly marked with a red cross on white back ground.
- Adequate arrangements shall be made for immediate recoument of the equipment when necessary.
- Nothing except the prescribed contents shall be kept in the First-aid box.
- The first-aid box shall be kept in charge of a responsible person who shall always be readily available during the working hours of the work place.
- A person in charge of the First-aid box shall be a person trained in First-aid treatment, in the work places where the number of contract labour employed is 150 or more.

19. Discoveries

Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

20. Possession of the Site

The Employer shall handover complete or part possession of the site to the Contractor 7 days in advance of construction programme. At the start of the work, the Employer shall handover the possession of at-least 75% of the site free of all encumbrances, the remaining 25 % of the possession as per contractor's construction programme.

21. Access to the Site

The Contractor shall allow access to the Site and to any place where work in connection with the Contract is being carried out, or is intended to be carried out to the Engineer and any person/persons/agency authorized by: a. The Engineer b. The Employer or authorized by the Employer.

22. Instructions

22.1 The Contractor shall carry out all instructions of the Engineer, which comply with the applicable laws where the Site is located.

22.2 The Contractor shall permit the appointed and/or authorized persons to inspect the Site and/or accounts and records of the Contractor and its subcontractors relating to the performance of the Contract, and to have such accounts and records audited by auditors appointed, if so required. The Contractor's attention is invited to Clause of 'Fraud and Corruption', which provides, inter alia, that acts intended to materially impede the exercise of the inspection and audit rights provided for under the Clause & constitute a obstructive practice subject to contract termination.

22.3 Engineer to have power to issue further drawings or instructions:

The Engineer shall have the power and authority from time to time and at all times to make and issue such further drawings and to give such further instructions and directions as may appear to him necessary or proper for the guidance of the contractor and the good and sufficient execution of the works according to terms of the specifications and Contractor shall receive, execute, obey and be bound by the same, according to the true intent and meaning thereof, as fully and effectually as though the same had accompanied or had been mentioned or referred to in the specification, and the Engineer may also alter or vary the levels or position of nature of works contemplated by the specifications, or may order any of the works contemplated thereby to be omitted, with or without the substitution of any other works in lieu thereof, or may order any work or any portion of work executed or partially executed, to be removed, changed or altered, added if needful,

may order that other works shall be substituted instead thereof and difference of expense occasioned by any such diminution or alteration so ordered and directed shall be added to or deducted from the amount of this Contract, as provided under condition no.10(a) hereinafter.

No work which radically changes the original nature of the Contract shall be ordered by the Engineer and in the event of any deviation being ordered which in the opinion of the Contractor changes the original nature of Contract he shall nevertheless carry it out and disagreement as to the nature of the work and the rate to be paid therefore shall be resolved in accordance with condition no.13d.

The time for completion of the Works, shall be in even of any deviations resulting in additional cost over the contract price being ordered, be extended or reduced reasonably by the Engineer. The Engineer's decision in this case shall be final.

B. Time Control

23. Programme

23.1 Within the time stated in the Contract Data, the Contractor shall submit to the Engineer for approval a Programme, including Environment Management Plan showing the general methods, arrangements, order, and timing for all the activities in the Works, along with monthly cash flow forecasts for the construction of works.

After the completion of the construction works, the programme for the Routine Maintenance Work, showing the general methods, arrangements, order and timing for all the activities involved in the Routine Maintenance will also be submitted by the Contractor to the Engineer for approval if specified in the tender. The programme for Routine Maintenance will be submitted in each year for the period of Maintenance.

23.2 The Contractor shall submit the list of equipment and machinery being brought to site, the list of key personnel being deployed, the list of machinery/ equipments being placed in field laboratory and the location of field laboratory along with the Programme. The Engineer shall cause these details to be verified at each appropriate stage of the programme.

23.3 An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining Works, including any changes to the sequence of the activities.

23.4 The Contractor shall submit to the Engineer for approval an updated Programme at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Programme within this period, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.

23.5 The Engineer's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Engineer again at any time. A revised Programme shall show the effect of Variations and Compensation Events.

24. Extension of Time In Contracts:

Subject to any requirement in the contract as to completion of any portions or portions of the works before completion of the whole, the contractor shall fully and finally complete the whole of the works comprised in the contract (with such modifications as may be directed under conditions of this contract) by the date entered in the contract or extended date in terms of the following clauses:

a) Extension attributable to BMC

(i) Extension Due To Modification: If any modifications have been ordered which in the opinion of the Engineer have materially increased the magnitude of the work, then such extension of the contracted date of completion may be granted as shall appear to the Engineer to be reasonable in the circumstances, provided moreover that the Contractor shall be responsible for requesting such extension of the date as may be considered necessary as soon as the cause thereof shall arise and in any case **should not be less than 30 days before the expiry of the date fixed for completion of the works.**

(ii) Extension For Delay Due To BMC: In the event of any failure or delay by the BMC to hand over the Contractor possession of the lands necessary for the execution of the works or to give the necessary notice to commence the works or to provide the necessary drawings or instructions or any other delay caused by the BMC due to any other cause whatsoever, then such failure or delay shall in no way affect or vitiate the contract or alter the character thereof or entitle the contractor to damages or compensation therefore, but in any such case, the BMC may grant such extension(s) of the completion date as may be considered reasonable.

Note: For extension of time period as governed in (i) and (ii) above, any modifications in design/drawings, specifications, quantities shall be needed to be justified with recorded reasons with approval of Ch.Eng. for not anticipating the same while preparing estimates and draft tender.

(b) Extension Of Time For Delay Due To Contractor: The time for the execution of the work or part of the works specified in the contract documents shall be deemed to be the essence of the contract and the works must be completed no later than the date(s) / the programme for completion of work as specified in the contract. If the contractor fails to complete the works within the time as specified in the contract for the reasons other than the reasons specified in above as (a.i) and (a.ii), the BMC may, if satisfied that the works can be completed by the contractor within reasonable short time thereafter, allow the contractor for further extension of time as the Engineer may decide. On such extension the BMC will be entitled without prejudice to any other right and remedy available on that behalf, to recover the compensation as governed by Clause 8(e) of GCC.

For the purpose of this Clause, the contract value of the works shall be taken as value of work as per contract agreement including any supplementary work order/contract agreement issued.

Further, competent authority while granting extension to the currency of contract under Clause (b) of as above may also consider levy of penalty, as deemed fit based on the merit of the case. Also, the reasons for granting extension shall be properly documented.

25. Delays Ordered by the Engineer

The Engineer may instruct the Contractor to delay the start or progress of any activity within the Works. Delay/delays totaling more than 30 days will require prior written approval of the DMC/AMC.

26. Management Meetings

26.1 The Engineer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the plans for progress of the Works.

26.2 The Engineer shall record the business of management meetings and provide copies of the record to those attending the meeting. The responsibility of the parties for actions to be

taken shall be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all those who attended the meeting.

C. Quality Control

27.1. Work to be open to Inspection and Contractor or Responsible agent to be present

All works under or in course of execution or executed in pursuance of the contract shall at all times be open to the inspection and supervision of the Eng-in-charge and his subordinates and the contractor shall at all times during the usual working hours, at all other times, during the usual working hours and at all other times at which reasonable notice of the intention of the Eng-in-charge and his subordinates to visit the works shall have been given to the contractor, either himself be present to receive orders and instruction or have responsible agent duly accredited in writing present for that purpose. Order given to the contractors' duly authorized agent shall be considered to have the same force and effect as if they had been given to the contractor himself.

27.2. Notice To Be Given Before Work Is Covered Up

The contractor shall give not less than ten days' notice in writing to the Eng-In-Charge or his subordinate incharge of the work before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimension thereof taken before the same is so covered up or placed beyond the reach of measurements and shall not cover up or place beyond the reach of measurement any work without the consent in writing of the Eng-In-Charge or his subordinate incharge of the work, and if any work shall be covered up or placed beyond the reach of measurement, without such notice having been given or consent obtained the same shall be uncovered at the contractors expenses, and in default thereof no payment or allowance shall be made for such work or for the materials with which the same was executed.

27.3 Works to be executed in accordance with specifications / drawings / orders etc. :

The contractor shall execute the whole and every part of the work the most substantial and workman like manner and both has regards material and every other respect in strict accordance with specifications. The contractor shall also confirm exactly, fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the Engineer In-charge and lodged in his office and to which the contractor shall be entitled to have access for the purpose of inspection at such office, or on the site or work

during office hours. The contractor shall be entitled to receive three sets of contract drawings and working drawings as well as one certified copy of the accepted tender along with the work order free of cost.

27.4 Ready Mix Concrete/ Asphalt Mix

- i) The contractor shall have to arrange Ready Mix concrete (RMC)/Asphalt from RMC/ASPHALT producing plants registered with BMC
- ii) The contractor shall, within a 7 days of award of the work, submit a list of at least three RMC/Asphalt producers with details of such plants including details and number of transit, mixers & pumps etc. to be deployed indicating name of owner/company, its location, capacity, technical establishment.
The Engineer-in-charge will reserve right to inspect at any stage and reject the concrete if he is not satisfied about quality of product at the user's end.
- iii) The Engineer-in-charge reserves the right to exercise control over the:-
 - a) Calibration check of the RMC/Asphalt plant.
 - b) Weight and quantity check on the ingredients, water and admixtures added for batch mixing for RMC plants
 - c) Time of mixing of concrete/grade of asphalt.
 - d) Testing of fresh concrete/asphalt mix, recording of results and declaring the mix fit or unfit for use. This will include continuous control on the work ability during production and taking corrective action, if required.
 - e) For exercising such control, the Engineer-in-charge shall periodically depute his authorized representative at the RMC/Asphalt plant. It shall be responsibility of the contractor to ensure that all necessary equipment, manpower & facilities are made available to Engineer-in-charge and or his authorized representative at RMC/Asphalt plant.
 - f) All required relevant records of RMC/Asphalt mix shall be made available to the Engineer-in-charge or his authorized representative. Engineer-in-charge shall, as required, specify guidelines & additional procedures for quality control & other parameters in respect of material production& transportation of concrete mix which shall be binding on the contractor & the RMC/Asphalt plant. Only concrete as approved in design mix by Engineer-in-charge shall be produced in RMC plant and transported to the site.

- g) The contractor shall have to produce a copy of chalan receipts/SCADA reports/VTS reports as issued by the RMC/Asphalt plant as a documentary proof in lieu of supply of RMC/Asphalt mix before releasing payment.

28. Identifying Defects

- 28.1 The Engineer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.
- 28.2 The Contractor shall permit the Employer's technical person(s) to check the Contractor's work and notify the Engineer and Contractor if any defects that are found.

29. Tests

- 29.1 For carrying out mandatory tests as prescribed in the specifications, the Contractor shall establish field laboratory at the location decided by Engineer. The field laboratory will have minimum of equipments as specified in the Contract Data. The contractor shall be solely responsible for:

- a. Carrying out the mandatory tests prescribed in the Specifications, and
- b. For the correctness of the test results, whether performed in his laboratory or elsewhere.

- 29.2 If the Engineer instructs the Contractor to carry out a test not specified in the Specification/ Quality Assurance Handbook to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no defect, the test shall be a compensation event.

When required by the Engineer-in-charge the contractor(s) shall supply for the purpose of testing samples of all materials proposed to be used in the works. Samples submitted either to govern bulk supplies or required for testing before use shall be in suitable packages to contain them and shall be provided free of charge by the contractor. The cost of testing shall be borne by the contractor even if the result of the sample confirm or do not confirm to the relevant BIS code specifications.

All expenditure required to be incurred for taking the samples conveyance, packing shall be borne by the contractor himself.

The failed material shall be removed from the site by the contractor at his own cost within a week time of written order of the Engineer-in-charge.

29.3 Setting of Site Laboratories:

Contractors shall set up a laboratory at site before commencement of work at their cost for performing various tests and at least the following machines and equipments shall be provided therein –

1. Set of Sieves as per I.R.C. /I.S.
2. Compressive Testing Machine(For new works)
3. Oven, Electrically Operated
4. Weighing Balance (20 kg capacity)
5. 3 m straight edge
6. Sieve shaker
7. First Aid Box
8. Measuring Jar (for silt content)
9. Other Machines/apparatus as may be directed by the Engineer
10. Vernier Caliber
11. Level / Theodolite

All the test records shall be maintained in the site office and made available as and when required. The laboratory must be established within 15 days from the date of receipt of the orders from Engineer In charge. On failure to do so, a penalty of Rs 1000/- per day shall be imposed.

The contractor shall install testing equipment at site. The contractor shall ensure and certify the calibration of the equipment so installed and shall maintain the same in working order throughout the period of construction. The contractor shall also provide necessary technically qualified experienced trained staff for carrying out such tests for using such equipment. The tests shall be carried out under the supervision of the Engineer-in-charge. The calibration shall be checked every twelve months as directed by Engineer-in-charge.

30. Correction of Defects noticed during the Defects Liability Period.

- (a) The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and ends after five years. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
- (b) Every time notice of Defect/Defects is given, the Contractor shall correct the notified Defect/Defects within the duration of time specified by the Engineer's notice.

(c) The Engineer may issue notice to the Contractor to carry out removal of defects or deficiencies, if any, noticed in his inspection, or brought to his notice. The Contractor shall remove the defects and deficiencies within the period specified in the notice and submit to the Engineer a compliance report.

31. Uncorrected Defects and Deficiencies

31.1 If the Contractor has not corrected a Defect pertaining to the Defect Liability Period under clause and deficiencies in maintenance, to the satisfaction of the Engineer, within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect or deficiency corrected, and the Contractor shall pay this amount, on correction of the Defect or deficiency by another agency.

D. Cost Control

32. Variations

The Engineer shall, having regard to the scope of the Works and the sanctioned estimated cost, have power to order, in writing, Variations within the scope of the Works he considers necessary or advisable during the progress of the Works. Such Variations shall form part of the Contract and the Contractor shall carry them out and include them in updated Programmes produced by the Contractor. Oral orders of the Engineer for Variations, unless followed by written confirmation, shall not be taken into account.

33. Payments for Variations

- 33.1 If rates for Variation items are specified in the Bill of Quantities, the Contractor shall carry out such work at the same rate.
- 33.2 The rate for Extra/Excess shall be governed by clause 10.A of Standard General Condition of Contract

34. Cash Flow Forecasts

When the Programme is updated, the Contractor shall provide the Engineer with an updated cash flow forecast.

35. Payment Certificates

The payment to the Contractor will be as follows for construction work:

- (a) A bill shall be submitted by the Contractor monthly or before the date fixed by the Engineer In-charge for all works executed in the previous month, and the Engineer In-

charge shall take or cause to be taken requisite measurement for the purpose of having the same verified and the claim, so far as it is admissible, shall be adjusted, if possible, within 10 days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid, the Engineer In-charge may depute a subordinate to measure up the said work in the presence of the contractor or his duly authorized agent whose counter signature to the measurement list shall be sufficient warrant, and Engineer In-Charge may prepare a bill from such list which shall be binding on the contractor in all respects.

- (b) The Engineer shall check the Contractor's fortnightly/monthly statement within 14 days and certify the amount to be paid to the Contractor.
- (c) The value of work executed shall be determined, based on measurements by the Engineer.
- (d) The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
- (e) The value of work executed shall also include the valuation of Variations and Compensation Events.
- (f) The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
- (g) The contractor shall submit all bills on the printed forms at the office of Engineer In-charge. The charges to be made in the bills shall always be entered at the rates specified in tender.

36. Payments

- 36.1 Payments shall be adjusted for deductions for advance payments, retention, security deposit, other recoveries in terms of the Contract and taxes at source, as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 15 days of the date of each certificate.
- 36.2 All sums payable by a contractor by way of compensation under any of these conditions, shall be considered as a reasonable compensation to be applied to the use of BMC without reference to the actual loss or damage sustained and whether any damage has or has not been sustained.
- 36.3 No payment shall be made for any work estimated to cost less than Rupees One Thousand till after the whole of work shall have been completed and the certificate of completion given. But in the case of works estimated to cost more than Rs. One Thousand, the contractor shall on submitting a monthly bill therefore be entitled to receive payment proportionate to the part of the work than approved and passed by the Engineer In-charge,

whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor. All such intermediate payments shall be regarded as payments by way of advance against the final payments only and not as payments for work actual done and completed and shall not preclude the Engineer In-charge from requiring any bad, unsound, imperfect or unskillful work to be removed or taken away and reconstructed or re-erected nor shall any such payment be considered as an admission of the due performance of the contract or any part thereof in any respect or the offering of any claim not shall it conclude, determine or effect in any other way, the powers of the Engineer In-charge as to the final settlement and adjustment of the accounts or otherwise, or in any other way vary or effect the contract. The final bill shall be submitted by the Contractor within one month of the date fixed for the completion of the work otherwise the Engineer In-charge's certificate of the measurements and of the total amount payable for the work shall be final and binding on all parties.

37. The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor for not having given early warning or not having **cooperated with the Engineer.**

38. Tax

G.S.T. and other state levies/cess which are not subsumed under GST will be applicable. The tenderer shall quote inclusive of all taxes it is clearly understood that BMC will not bear any additional liability towards payments of any Taxes and Duties.

Whenever the services to be provided by the tenderers fall under Reverse Charge Mechanism, the prize quoted shall be exclusive of GST, but inclusive of Taxes/Duties/Cess other than GST, if any.

Rates accepted by BMC shall hold good till completion of work and no additional individual claim shall be admissible on account of fluctuations in market rates; increase in taxes/any other levies/tolls etc. except that payment/recovery for overall market situation shall be made as per Price Variation and if there is any subsequent change (after submission of bid) in rate of GST applicable on the work/services to be executed as per tender i.e. any increase will be reimbursed by BMC whereas any reduction in the rate of GST shall be passed on to BMC as per the provisions of the GST Act.

As per circular u/No. CA/F/Project/City/19 Dt. 15.09.2017, Tenderer shall submit the Irrevocable Undertaking on Rs.500/- stamp paper as per **Annexure-A** as attached at page no. 145.

39. Currencies

All payments will be made in Indian Rupees.

40. Liquidated Damages

Employers have all the rights to decide the liquidated damages.

41. Cost of Repairs

Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at his cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

42. Completion of Construction and Maintenance

42.1 The Contractor shall request the Engineer to issue a certificate of completion of the construction of the works, and the Engineer will do so upon deciding that the works is completed. This shall be governed as per clause no.8(g) of Standard General Conditions of Contract.

43. Taking Over

43.1 The Employer shall take over the works within seven days of the Engineer issuing a certificate of completion of works. The Contractor shall continue to remain responsible for its routine maintenance during the maintenance period if specified in the contract.

44. Final Account

Final joint measurement along with the representatives of the contractor should be taken recorded and signed by the Contractors. Contractors should submit the final bill within 1 month of physical completion of the work.

If the contractor fails to submit the final bill within 1 month, the BMC staff will prepare the final bill based on the joint measurement within next 3 months.

Engineer's decision shall be final in respect of claims for defect and pending claims against contractors.

No further claims should be made by the Contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payment of those items of the bills in respect of which there is no dispute and of items in dispute, for quantities and

rates as approved by the Commissioner shall be made within a reasonable period as may be necessary for the purpose of verification etc.

After payment of the final bill as aforesaid has been made, the contractor may, if he so desires, reconsider his position in respect of a disputed portion of the final bills and if he fails to do so within 84 days, his disputed claim shall be dealt with as provided in the contract.

A percentage of the retention money, over and above the actual retention money as indicated below shall be held back from payments till the finalization of final bill to be submitted as per above and will be paid within 30 days of acceptance of the final bill.

Sr. no.	Amount of Contract Cost	Minimum Payable Amount in final bill
1	Upto Rs.5 Crs.	Rs.10 Lacs or final bill whichever is more
2	Upto Rs.25 Crs.	Rs.1 Crore or final bill amount whichever is more
3	UptoRs. 50 Crs.	Rs.2 Crores or final bill amount whichever is more
4	Upto Rs.100 Crs.	Rs.4 Crore or final bill amount whichever is more
5	More than Rs.100 Crs..	Rs.7 Crore or final bill amount whichever is more

The contractor have to submit the bill for the work carried out within 15 days from the date of completion of the work to the respective executing department. If the contractor fails to submit their bills to concerned executing department, penalty or action as shown below will be taken for each delayed bill:-

After 15 days from the date of completion/running bill upto certain date, upto next 15 days i.e. upto 30 days	Equal to 5% of bill amount
Next 15 days upto 45 days from the date of completion/running bill upto specified date	Equal to 10% of bill amount
If not submitted within 45 days from the date of completion/ R.A. bill	Bill will not be admitted for payment.

45. Operating and Maintenance Manuals

45.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

45.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

46. Termination

46.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

46.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:

- a) the Contractor stops work for 30 days when no stoppage of work is shown on the current Programme and the stoppage has not been authorized by the Engineer;
- b) the Contractor is declared as bankrupt or goes into liquidation other than for approved reconstruction or amalgamation;
- c) the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
- d) the Contractor does not maintain a Security, which is required;
- e) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in relevant clause.
- f) the Contractor fails to provide insurance cover as required under relevant clause .
- g) if the Contractor, in the judgment of the Employer, has engaged in the corrupt or fraudulent practices as defined in GCC in competing for or in executing the Contract.
- h) if the Contractor fails to set up a field laboratory with the prescribed equipment, within the period specified in the Contract Data; and
- i) i)any other fundamental breaches as specified in the Contract Data.
- j) if the Contractor fails to deploy machinery and equipment or personnel as specified in the Contract Data at the appropriate time.

46.3 When either party to the contract gives notice of a breach of contract to the Engineer for a cause other than those listed above, the Engineer shall decide whether the breach is fundamental or not.

46.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

46.5 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

47. Payment upon Termination

47.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for value of the work done and materials ordered less liquidated damages, if any, less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as indicated in the Contract Data. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be recovered from the security deposit, and performance security. If any amount is still left un-recovered it will be a debt due from the Contractor to the Employer

47.2 If the Contract is terminated at the Employer's convenience, the Engineer shall issue a certificate for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the Contract, and less taxes due to be deducted at source as per applicable law.

48. Property

48.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer for use for completing balance construction work if the Contract is terminated because of the Contractor's default, till the Works is completed after which it will be transferred to the Contractor and credit, if any, given for its use.

49. Release from Performance

If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of the Employer or the Contractor, the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as

possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.

Other Conditions of Contract

50. Labour

- 50.1 The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.
- 50.2 The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the number of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

51. Compliance with Labour Regulations

- (a) During continuance of the Contract, the Contractor and his sub-Contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority.
- (b) Furthermore, the Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/Employer shall have the right to deduct any money due to the Contractor including his amount of performance guarantee. The Employer/Engineer shall also have right to recover from the

Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

(c) The Contractor shall require his employees to obey all applicable laws, including those concerning safety at work.

(d) The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

52. Drawings and Photographs of the Works

52.1 The Contractor shall do photography/video photography of the site firstly before the start of the work, secondly mid-way in the execution of different stages of work as required by Engineer In-charge and lastly after the completion of the work. No separate payment will be made to the Contractor for this.

The Contractor shall not disclose details of Drawings furnished to him and works on which he is engaged without the prior approval of the Engineer in writing. No photograph of the works or any part thereof or plant employed thereon, except those permitted under above clause, shall be taken or permitted by the Contractor to be taken by any of his employees or any employees of his sub-Contractors without the prior approval of the Engineer in writing. No photographs/ Video photography shall be published or otherwise circulated without the approval of the Engineer in writing.

53. The Apprentices Act, 1961

The Contractor shall duly comply with the provisions of the Apprentices Act 1961 (III of 1961), the rules made there under and the orders that may be issued from time to time under the said Act and the said Rules and on his failure or neglect to do so, he shall be subject to all liabilities and penalties provided by the said Act and said Rules.

54 Contract Document

The documents forming the contract are to be taken as mutually explanatory of one another. Unless otherwise provided in the contract, the priority of the documents forming the contract shall be, as follows:

1. Contract Agreement (if completed)
2. The letter of Acceptance
3. The Bid:
4. Addendum to Bid; if any

5. Tender Document
6. The Bill of Quantities:
7. The Specification:
8. Detailed Engineering Drawings
9. Standard General Conditions of Contracts (GCC)
10. All correspondence documents between bidder/contractor and BMC.

55. Conflict of Interest

The Applicant shall not have a conflict of interest (the “Conflict of Interest”) that affects the Bidding Process. Any Applicant found to have a Conflict of Interest shall be disqualified. An Applicant shall be deemed to have a Conflict of Interest affecting the Bidding Process, if

A constituent of such Applicant is also a constituent of another Applicant; or Such Applicant has the same legal representative for purposes of this Application as any other Applicant; or

Such Applicant, or any Associate thereof has a relationship with another Applicant, or any Associate thereof, directly or through common third party/ parties, that puts either or both of them in a position to have access to each other’s information about, or to influence the Application of either or each other; or

The Applicant shall be liable for disqualification if any legal, financial or technical adviser of the Authority in relation to the Project is engaged by the Applicant, its Member or any Associate thereof, as the case may be, in any manner for matters related to or incidental to the Project. For the avoidance of doubt, this disqualification shall not apply where such adviser was engaged by the Applicant, its Member or Associate in the past but its assignment expired or was terminated 6 (six) months prior to the date of issue of this TENDER. Nor will this disqualification apply where such adviser is engaged after a period of 3 (three) years from the date of commercial operation of the Project.

56. Applications and costs thereof

No Applicant shall submit more than one Application for the Project. An applicant applying individually shall not be entitled to submit another application either individually. The Applicant shall be responsible for all of the costs associated with the preparation of their Applications and their participation in the Bid Process. The Authority will not be responsible or in any way liable for such costs, regardless of the conduct or

outcome of the Bidding Process.

57 Acknowledgment by Applicant

It shall be deemed that by submitting the Application, the Applicant has:

- a. made a complete and careful examination of the tender;
- b. received all relevant information requested from the Authority;
- c. accepted the risk of inadequacy, error or mistake in the information provided in the tender or furnished by or on behalf of the Authority relating to any of the matters referred; and
- d. Agreed to be bound by the undertakings provided by it under and in terms hereof.

“The Authority” shall not be liable for any omission, mistake or error in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to the TENDER or the Bidding Process, including any error or mistake therein or in any information or data given by the Authority.

58 Right to accept or reject any or all Applications/ Bids

Notwithstanding anything contained in this TENDER, “The Authority” reserves the right to accept or reject any Application and to annul the Bidding Process and reject all Applications/ Bids, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons therefore. In the event that the Authority rejects or annuls all the Bids, it may, in its discretion, invite all eligible Bidders to submit fresh Bids hereunder.

“The Authority” reserves the right to reject any Application and/ or Bid if:

at any time, a material misrepresentation is made or uncovered, or the Applicant does not provide, within the time specified by the Authority, the supplemental information sought by the Authority for evaluation of the Application.

In case it is found during the evaluation or at any time before signing of the Agreement or after its execution and during the period of subsistence thereof including the concession thereby granted by “The Authority”, that one or more of the pre-qualification conditions have not been met by the Applicant, or the Applicant has made material misrepresentation or has given any materially incorrect or false information, the Applicant shall be disqualified forthwith if not yet appointed as the Successful Bidder either by issue of the LOA (Letter of Approval) or entering into of the Agreement, and if the Applicant has

already been issued the LOA or has entered into the Concession Agreement, as the case may be, the same shall, notwithstanding anything to the contrary contained therein or in this TENDER, be liable to be terminated, by a communication in writing by “The Authority” to the Applicant, without the Authority being liable in any manner whatsoever to the Applicant and without prejudice to any other right or remedy which the Authority may have under this TENDER, the Bidding Documents, the Concession Agreement or under applicable law.

“The Authority” reserves the right to verify all statements, information and documents submitted by the Applicant in response to the TENDER. Any such verification or lack of such verification by the Authority shall not relieve the Applicant of its obligations or liabilities hereunder nor will it affect any rights of the Authority there under.

59. The bid shall be rejected if the bidder-

- a. Stipulates the validity period less than 180 days.
- b. Stipulates own condition/conditions.
- c. Does not fill and (digital) sign undertaking forms, which are incorporated, in the document.

60. Clarifications

Applicants requiring any clarification on the tender may notify “the Authority” in writing or by fax or e-mail. They should send in their queries before the date specified in the header data. “The Authority” shall Endeavor to respond to the queries within the period specified therein. The responses will be sent by fax and/or e-mail. The Authority will forward all the queries and its responses thereto, to all purchasers of the TENDER without identifying the source of queries.

“The Authority” shall Endeavor to respond to the questions raised or clarifications sought by the Applicants. However, the Authority reserves the right not to respond to any question or provide any clarification, in its sole discretion, and nothing in this Clause shall be taken or read as compelling or requiring the Authority to respond to any question or to provide any clarification, but not later than the date provided in header data.

“The Authority” may also on its own motion, if deemed necessary, issue interpretations and clarifications to all Applicants. All clarifications and interpretations issued by the Authority shall be deemed to be part of the tender. Verbal clarifications and information given by Authority or its employees or representatives shall not in any way or manner be

binding on the Authority.

61. Amendment of tender

At any time prior to the deadline for submission of Application, the Authority may, for any reason, whether at its own initiative or in response to clarifications requested by an Applicant, modify the tender by the issuance of Addendum.

Any Addendum thus issued will be sent in writing/ Fax/ Email to all those who have purchased the tender.

In order to afford the Applicants a reasonable time for taking an Addendum into account, or for any other reason, the Authority may, in its sole discretion, extend the Application Due Date.

Preparation and Submission of Application

62. Language

The Application and all related correspondence and documents in relation to the Bidding Process shall be in English language. Supporting documents and printed literature furnished by the Applicant with the Application may be in any other language provided that they are accompanied by translations of all the pertinent passages in the English language, duly authenticated and certified by the Applicant. Supporting materials, which are not translated into English, may not be considered. For the purpose of interpretation and evaluation of the Application, the English language translation shall prevail.

63. Format and signing of Application

The Applicant shall provide all the information sought under this TENDER. The Authority will evaluate only those Applications that are received in the required formats and complete in all respects. Incomplete and /or conditional Applications shall be liable to rejection.

The Applicant will upload bid in One Folder in electronic form which shall contain the scanned certified copies of the documents given below and the documents uploaded has to be digitally signed by the bidder. These copies shall be certified by Practicing Notary approved by the Govt. of Maharashtra or Govt. of India with his stamp, clearly stating his name & registration number, except where original documents are demanded.

64. Marking of Applications

The Applicant shall submit the Application in the format specified at Appendix-I, together with the documents, upload in folder as “VENDOR” together with their respective enclosures

Applications submitted by fax, telex, telegram shall not be entertained and shall be rejected outright.

65. Late Applications

Applications received by the Authority after the specified time on the Application Due Date shall not be eligible for consideration and shall be summarily rejected.

66. Confidentiality

Information relating to the examination, clarification, evaluation, and recommendation for the short-listed qualified Applicants shall not be disclosed to any person who is not officially concerned with the process or is not a retained professional advisor advising the Authority in relation to or matters arising out of, or concerning the Bidding Process. The Authority will treat all information, submitted as part of Application, in confidence and will require all those who have access to such material to treat the same in confidence. The Authority may not divulge any such information unless it is directed to do so by any statutory entity that has the power under law to require its disclosure or is to enforce or assert any right or privilege of the statutory entity and/ or the Authority or as may be required by law or in connection with any legal process.

67. Clarification of Financial Bids

To assist in the examination, evaluation and comparison of Bids, the Engineer may, at his discretion, ask any bidder for clarification of his Bid, including breakdown of unit rates. The request for clarification and the response shall be in writing or by post/facsimile/e-mail. No Bidder shall contact the Engineer on any matter relating to his bid from the time of the bid opening to the time the contract is awarded. Any effort by the Bidder to influence the Engineer in the Engineer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidder's bid.

68. Inspection of site and sufficiency of tender:

1. The Contractor shall inspect and examine the site and its surrounding and shall satisfy himself before submitting his tender as to the nature of the ground and subsoil (so far as is practicable), the form and nature of the site, the quantities and nature of the work and materials necessary for the completion of the works and means of access to the site, the accommodation he may require and in general shall himself obtain all necessary information as to risk, contingencies and other circumstances which may influence or affect his tender. He shall also take into consideration the hydrological and climatic conditions.

2. The Employer may make available to the Contractor data on hydrological and sub-surface conditions as obtained by or on his behalf from investigations relevant to the works but the Contractor shall be responsible for his own interpretation thereof. The contractor shall engage his investigating agency with prior approval of the Engineer from the approved list of such agencies by BMC or Govt at his cost initially before commencing actual work and which shall be reimbursed immediately subject to satisfaction of the Engineer for faithful compliance and submission of required data regarding such investigation within specified time.
3. The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the schedule of works / items / quantities, or in Bill of Quantities, which rates and prices shall, except as otherwise provided cover all his obligations under the Contract and all matters and things necessary for proper completion and maintenance of the works. No extra charges consequent on any misunderstanding.
4. **Not Foreseeable Physical Obstructions or Conditions:** If, however, during the execution of the Works the Contractor encounters physical obstructions or physical conditions, other than climatic conditions on the Site, which obstructions or conditions were, in his opinion, not foreseeable by an experienced contractor, the Contractor shall forthwith give notice thereof to the Engineer. On receipt of such notice, the Engineer shall, if in his opinion such obstructions or conditions could not have been reasonably foreseen by an experienced contractor, after due consultation with the Contractor, determine:
 - any extension of time to which the Contractor is entitled and
 - The amount of any costs which may have been incurred by the Contractor by reason of such obstructions or conditions having been encountered, which shall be added to the Contract Price and shall notify the Contractor accordingly. Such determination shall take account of any instruction which the Engineer may issue to the Contractor in connection therewith, and any proper and reasonable measures acceptable to the Engineer which the Contractor may take in the absence of specific instructions from the Engineer. However such costings shall be got approved by the competent authority as governed vide rules prevailing with authority.
- 5 **Office for the Engineer (Works costing upto Rs.50 Lakhs)**

The Contractor shall at his own cost and to satisfaction of the Engineer provide a small temporary office, at the work-site which will include tables, chairs and lockers

for keeping the records. He shall also make necessary arrangements for drinking water, telephone with a pre-requisite of e-governance and electronic communication. These offices are not to be allowed on public roads without the written instruction of the Engineer. These offices should be preferably located within 50m to 500 m of the worksite. In case the office is more than 500m away from the worksite, the contractor is to provide conveyance for Municipal Staff.

6. Office for the Engineer (Works costing above Rs.50 lakhs)

The Contractor shall at his own cost and to satisfaction of the Engineer provide a temporary office at the work-site which will include tables, chairs and lockers for keeping the records. He shall also make necessary arrangements for drinking water, latrines, with doors, windows, locks, bolts and fastenings sufficient for security for the Engineer, and his subordinates, as close to the works from time to time in progress as can be conveniently arranged, and shall at his own cost furnish the office with such chairs, tables, lockers, locks and fastenings as may be required by the Engineer, and no expense of any kind in connection with the erection or upkeep of the offices or fittings shall be borne by the Corporation, but all such work shall be carried out by the Contractor and the expenses thereof defrayed by him. The Contractor shall also make water connections and fit up stand pipe with a bib tap at each office. The latrines and the water connections shall be subject to all the conditions herein elsewhere laid down for temporary water connection and latrines generally with all requisite equipments for e-governance and electronic and digital communication. These offices are not to be allowed on public roads without the written instruction of the Engineer. These offices should be preferably located within 50 to 500 m of the worksite. ~~In case the office is more than 500m away from the worksite, the contractor is to provide conveyance. Also, for staff working beyond working hours the contractor has to provide conveyance.~~ Since the scattered in three different wards, the contractor has to provide two site offices i.e. two in R/C ward & other in R/S ward as per SBD section no.9, clause no.68.6.

7. **Permission for provision and removal of office on completion of work:** The tenderer shall obtain permission for provision of site office, cement go-down, store, etc. on payment of necessary cost implication. The cement go-down, Watchman cabins, etc. shall be provided as directed and shall be removed by the Tenderers on completion of the work at their cost. It is binding on the Tenderer to fulfill requirements of Environmental Authorities. The location of such office shall be finalized and got approved from the Engineer before erection/commencement work.

8. **Contractor's office near works:** The Contractor shall have an office near the works at

which notice from the Commissioner or the Engineer may be served and shall, between the hours of sunrise and sunset on all working days, have a clerk or some other authorized person always present at such office upon whom such notices may be served and service of any notices left with such clerk or other authorized person or at such office shall be deemed good service upon the Contractor and such offices shall have pre-requisite facilities for e-governance.

69. Official Secrecy:

The Contractor shall of all the persons employed in any works in connection with the contract that the India Official Secrets Act 1923 (XIX of 1923) applies to them and will continue to apply even after execution of the said works and they will not disclose any information regarding this contract to any third party. The contractor shall also bring into notice that, any information found to be leaked out or disclosed the concern person as well as the Contractor will be liable for penal action; further the Corporation will be at liberty to terminate the contract without notice.

70. Subsequent Legislation:

If on the day of submission of bids for the contract, there occur changes to any National or State statute, Ordinance, decree or other law or any regulation or By-laws or any local or other duly constituted authority or the introduction of any such National or State Statute, Ordinance, decree or by which causes additional or reduced cost to the Contractor, such additional or reduced cost shall, after due consultation with the Contractor, be determined by the concerned Engineering Department of BMC and shall be added to or deducted from the Contract Price with prior approval of competent authority and the concerned Engineering Department shall notify the Contractor accordingly with a copy to the Employer. BMC reserve the right to take decision in respect of addition/reduction of cost in contract.

71. Patent, Right and Royalties:

The contractor shall save harmless and indemnify the Corporation from and against all claims and proceedings for or on account of infringement of any Patent rights, design trademark or name of other protected rights in respect of any constructional plant, machine work, or material used for or in connection with the Works or any of them and from and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. Except where otherwise specified,

the contractor shall pay all tonnage and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay or other materials required for the works or any of them.

72. Payments, Tax and Claims:

- **The limit for unforeseen claims**

Under no circumstances whatever the contractor shall be entitled to any **compensation** from BMC on any account unless the contractor shall have submitted a claim in writing to the Eng-in-charge within 1 month of the case of such claim occurring.

- **No interest for delayed payments due to disputes, etc:**

It is agreed that the Municipal Corporation of Greater Mumbai or its Engineer or Officer shall not be liable to pay any interest or damage with respect of any moneys or balance which may be in its or its Engineer's or officer's hands owing to any dispute or difference or claim or misunderstanding between the Municipal Corporation of Greater Bombay or its Engineer or Officer on the one hand and the contractor on the other, or with respect to any delay on the part of the Municipal Corporation of Greater Bombay or its Engineer or Officers in making periodical or final payments or in any other respect whatever.

73. Settlement of Disputes:

- **Termination of contract for death**

If the Contractor is an individual or a proprietary concern and the individual or the proprietor dies and if the Contractor is a partnership concern and one of the legal representative of the individual Contractor or the proprietor of the proprietary concern and in case of partnership, the surviving partners, are capable of carrying out and completing the contract, the Commissioner shall be entitled to cancel the contract as to its uncompleted part without the Corporation being in any way liable to payment of any compensation to the estate of the deceased Contractor and or to the surviving partners of the Contractor's firm on account of the cancellation of the contract. The decision of the Commissioner that the legal representative of the deceased Contractor or surviving partners of the Contractor's

firm cannot carry out and complete the contract shall be final and binding on the parties. In the event of such cancellation the Commissioner shall not hold estate of the deceased Contractor and or surviving partners of the Contractor's firm liable in damages for not completing the contract.

- **Settlement of Disputes:**

If any dispute or differences of any kind whatsoever other than those in respect of which, the decision of any person is, by the Contract, expressed to be final and binding) shall arise between the Employer and the Contractor or the Engineer and the Contractor in connection with or arising out of the Contract or carrying out of the Works (Whether during the progress of the Works or after their completion and whether before or after the termination, abandonment or breach of the Contract) it, the aggrieved party may refer such dispute within a period of 7 days to the concerned Addl. Municipal Commissioner who shall constitute a committee comprising of three officers i.e. concerned Deputy Municipal Commissioner or Director (ES&P), Chief Engineer other than the Engineer of the Contract and concerned Chief Accountant. The Committee shall give decision in writing within 60 days. Appeal on the Order of the Committee may be referred to the Municipal Commissioner within 7 days. Thereafter the Municipal Commissioner shall constitute a Committee comprising of three Addl. Municipal Commissioners including Addl. Municipal Commissioner in charge of Finance Department. The Municipal Commissioner within a period of 90 days after being requested to do so shall give written notice of committee's decision to the Contractor. Save as herein provided such decision in respect of every matter so referred shall be final and binding upon both parties until the completion of the works, and shall forthwith be given effect to by the Contractor who shall proceed with the works with due diligence, whether he requires arbitration as hereinafter provided or not. If the Commissioner has given written notice of the decision to the Contractor and no Claim to arbitration has been communicated within a period of 90 days from receipt of such notice the said decision shall remain final and binding upon the Contractor.

74. Arbitration and Jurisdiction:

If the Commissioner fails to give notice of the decision as aforesaid within a period of 90 days after being requested as aforesaid or if the Contractor is dissatisfied with any such decision, then the Contractor may within 90 days after receiving notice of such decision or within 90 days after the expiration of the first named period of 90 days (as the case may be) require that the matter or matters in dispute be referred to arbitration as hereinafter provided.

i) In case of a contract where the contract price and/ or contract value is less than Rs. 5,00,00,000/- (Rupees Five Crore Only), any dispute arising out of or in connection with this contract, including any question regarding its existence, validity or termination, shall be referred to a mutually agreed arbitral tribunal in accordance with the Arbitration and Conciliation Act, 1996 (amended upto date). The arbitral tribunal shall consist of a sole arbitrator, as mutually agreed upon by the parties and the said dispute shall be finally resolved by the said arbitral tribunal. The decision of the arbitral tribunal shall be in writing (with reasons) and which will be final and binding upon the parties hereto and the expenses of the arbitration shall be paid as may be determined by the arbitral tribunal. The seat of the arbitration shall be Mumbai. The venue of arbitration shall be within the limits of Brihan Mumbai. The language of the Arbitration shall be English.

If the parties fails to appoint mutually agreed arbitral tribunal, within the period of 30 days from the date of application seeking arbitration in the dispute, the arbitral tribunal shall be appointed by the recognised arbitral institution i.e. Mumbai Centre for International Arbitration (approved by Government of Maharashtra under G.R. Do. ARB Case No. 1/2017/D-19 dtd. 28.02.2017) as per the Arbitration Rules of the Mumbai Centre for International Arbitration then in force ("MCIA Rules").

(ii) In case of contract where the contract price and/ or contract value is Rs 5,00,00,000/- (Rupees Five Crore Only) or more, any dispute arising out of or in connection with such a contract, including any question regarding its existence, validity or termination, shall be directly referred to and finally resolved by the recognized arbitral institution i.e. Mumbai Centre for International Arbitration (approved by Government of Maharashtra under G.R. no. ARB Case No. 1/2017/D-19 dtd. 28.02.2017) as per the Arbitration Rules of the Mumbai Centre for International Arbitration then in force (MCIA Rules") The arbitral tribunal shall consist of a sole arbitrator. The seat of the arbitration shall be Mumbai. The language of the Arbitration shall be English.

In either case, the law governing this arbitration agreement and the contract shall be Indian Law.

75. Copyright:

The copyright of all drawings and other documents provided by the Contractor under the contract shall remain vested in the Contractor or his sub-contractors as the case may be the employer shall have a license to use such drawings and other documents in connection with the design, construction, operation, maintenance of the works. At any time the Employer shall have further license without additional payment to the Contractor to use any such drawings or documents for the purpose of making any improvement of the works or enlargement or duplication of any part thereof, provided that such improvement, enlargement, or duplication by itself or in conjunction with any other improvements, enlargements or duplications already made in accordance with the further license does not result in the duplication of the whole works.

76. Receipts to be signed in firm's name by any one of the partners:

Every receipt for money which may become payable or for any security which may become transferable to the Contractor under these present shall, if signed in the partnership name by any one of the partners, be a good and sufficient discharge to the Commissioner and Municipal Corporation in respect of the money or security purporting to be acknowledged thereby, and in the event of death of any of the partners during the pendency of this contract, it is hereby expressly agreed that every receipt by any one of the surviving partners shall, if so signed as aforesaid, be good and sufficient discharge as aforesaid provided that nothing in this clause contained shall be deemed to prejudice or effect any claim which the Commissioner or the Corporation may hereafter have against the legal representatives of any partners so dying or in respect of any breach of any of the conditions thereof, provided also that nothing in this clause contained shall be deemed prejudicial or affect the respective rights or obligations of the Contractors and of the legal representatives of any deceased Contractors interest.

77. Proprietary data

All documents and other information supplied by the Authority or submitted by an Applicant to the Authority shall remain or become the property of the Authority. Applicants are to treat all information as strictly confidential and shall not use it for any purpose other than for preparation and submission of their Application. The Authority will not return any Application or any information provided along therewith.

78. Correspondence with the Applicant

Save and except as provided in this TENDER, the Authority shall not entertain any correspondence with any Applicant in relation to the acceptance or rejection of any Application.

79. Price Variation Clause

The Contractor shall be reimbursed or shall refund to the Corporation as the case may be the variation in the value of the work carried out from time to time, depending on whether the prices of material and labour as a whole rise or fall, and the method adopted for such computations shall be as given below, it being clearly understood that the contractor shall have no claim for being reimbursed on the ground that the price of a particular material or group of materials have risen beyond the limits of the presumptions made in the following paras, however, no price variations shall be made applicable for contracts upto 12 months:

- A) Controlled materials: Price variations shall be permitted in respect of these materials the price level of which is controlled by the Government or its agency. The rate ruling on the date of submission of the tender shall be considered as the basic price of such material for adjustment. Any variation in this rate shall be considered for reimbursement to the contractor or refund to be claimed from the contractor as the case may be. The contractor shall, for the purpose of adjustment submit in original the relevant documents from the suppliers.
- B) Labour and other materials: For the purpose of this contract and for allowing reimbursement or refund on account of variation of prices of (i) labour, and (ii) materials other than materials mentioned in A above, computation will be based on the formula enunciated below which is based on the presumptions that :
- i) The general price level of labour, rises or falls in proportion to the rise or fall of consumer price index number 9 (general) for working class in Mumbai.
 - ii) The general price level of materials rises or falls in proportion to rise or fall of whole-sale price index as published by 'Economic Adviser to Govt. of India'.
 - iii) And that the component of labour is to the extent of 30 percent of 88 percent and the component of materials is to the extent of 70 percent of 88 percent of the value of the work carried out. The remaining 12 percent being the presumptive profit of the contractor.

a) Formula for Labour component:

$$VL = \frac{(0.88 R) \times 30}{100} \times \frac{(I - IO)}{IO}$$

b) Formula for Material component :

$$VM = \frac{(0.88 R \times 70 - C)}{100} \times \frac{(W - WO)}{WO}$$

Where –

VL = Amount of price variation to be reimbursed or claimed as refund on account of general rise or fall of index referred to above.

I = Consumer Price Index number of working class for Mumbai (declared by the Commissioner of Labour and Director of Employment, Mumbai) applicable to the period under reference (base year ending 2004-05 as 100 i.e. new series of indices).

IO = Consumer price index number for working class for Mumbai (declared by the Commissioner of labour and Director of Employment, Mumbai) prevailing, on the day of 28 days prior to the date of submission of the tender.

VM = The amount of price variation to be reimbursed or claimed as refund on account of general rise or fall of wholesale price index for period under reference.

W = Average wholesale price index as published by Economic Adviser to Govt. of India applicable to the period under reference.

WO = Wholesale price index as stated above prevailing on the day of 28 days prior to the date of submission of the tender.

R = Total value of the work done during the period under reference as recorded in the Measurement Book excluding water charges and sewerage charges but including cost of excess in respect of item upto 50 percent

C = Total value of Controlled materials used for the works as recorded in Measurement Book and paid for at original basic rate plus the value of materials used .

- i) The quantity of the Controlled material adopted in working out the value of 'C' shall be inclusive of permitted wastages as / if mentioned in specifications.
- ii) The basic rate for the supply of controlled material shall be inclusive of all the components of cost of materials excluding transport charges incurred for bringing the material from place of delivery to the site.

Computations based on the above formula will be made for the period of each bill separately and reimbursement will be made to (when the result is plus) and refund will be claimed from (when the result is minus) the contractor's next bill. The above formulae will be replaced by the formulae in Annexure-I as and when mentioned in special conditions of contract

The operative period of the contract for application of price variation shall mean the period commencing from the date of commencement of work mentioned in the work order and ending on the date when time allowed for the work order and ending on the date when time allowed for the work specified in the contract for work expires, taking into consideration, the extension of time, if any, for completion of the work granted by Engineer under the relevant clause of the conditions of contract in cases other than those where such extension is necessitated on account of default of the contractor.

The decision of the Engineer as regards the operative period of the contract shall be final and binding on the contractors.

- iii) Where there is no supply of controlled items to contractor the component 'C' shall be taken as zero.
- C) Adjustment after completion: If the Contractor fails to complete the works within the time for completion adjustment of prices thereafter until the date of completion of the works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices whichever is more favorable to the employer, provided that if an extension of time is granted, the above provision shall apply only to adjustments made after the expiry of such extension of time.
- D) Price variation will be calculated similarly and separately for extra items and / or excess quantities and provisional sums calculated under Sub Clause 10 (b)A (i)&(ii) and Sub Clause 10 (b) B(ii) of Standard G.C.C. based on the above formula/formulae in Annexure-I as and when mentioned in Special conditions of contract; IO and WO being the indices applicable to the date on which the rates under Sub Clause 10 (a)A (i)&(ii) and Sub Clause 10 (a) B(iii) of Standard G.C.C. are fixed. No price variation shall be admissible for FAIR items created during execution.

80. Maximum Price Variation shall be as follows:

Time Period of Project	Maximum limit of Price Variation
Up to 12 months	No variation allowed

Above 12 months to 24 months	5%
Above 24 months	10%

***Approval of AMC/MC shall be obtained before invitation of tender in case of any changes in above.**

Note: 1) The extension in time period for the projects originally estimated including monsoon results in change of price variation slabs as mentioned above i.e. from first slab to second slab or from second slab to third slab, then the maximum limit of original slab will prevail.

2) Operative period shall mean original or extended time period of contract.

For example:

Extension of Time period	Maximum Price Variation
If original period of 11 months including monsoon extends to 16. The operative period will be 11+5 months.	No variation allowed
If original period of 11 months excluding monsoon extends to 16. The operative period will be 11+5 months.	Maximum 5% variation allowed

Price Variation during Extended Period of Contract:

(i) Extension Due To Modification & Extension for delay due to BMC :

The price variation for the period of extension granted shall be limited to the amount payable as per the Indices. In case the indices increases or decreases, above/below the indices applicable, to the last month of the original or extended period vide clause 8 (l)(a)(i) and (ii) of standard GCC

(ii) Extension Of Time For Delay Due To Contractor:

(a) The price variation for the period of extension granted shall be limited to the amount payable as per the Indices in case the indices increase, above the indices applicable, to the last month of the original completion period or the extended period vide above clause 8(l)(a)(i) and (ii) of standard GCC.

(b) The price variation shall be limited to the amount payable as per the indices, in case the indices decrease or fall below the indices applicable, to the last month of original / extended period of completion period vide above clause 8(l)(b) of standard GCC, then lower indices shall be adopted.

(iii) Extension of Time For Delay due to reasons not attributable to BMC and Contractor (Reference Cl.8 (d) of Standard GCC):

The price variation for the period of extension granted shall be limited to the amount payable as per the Indices in case the indices increases or decreases, above/below the indices applicable, to the last month of the original period.

81. Payment:

Interim Payment :

- i) Interim bills shall be submitted by the Contractor from time to time (but at an interval of not less than one month) for the works executed. The Engineer shall arrange to have the bills verified by taking or causing to be taken, where necessary, the requisite measurement of work.
- ii) Payment on account for amount admissible shall be made on the Engineer certifying the sum to which the Contractor is considered entitled by way of interim payment for all the work executed, after deducting there from the amount already paid, the security deposit / retention money and such other amounts as may be deductible or recoverable in terms of the contract.
- iii) On request, the contractor will be paid upto 75 percent of the value of the work carried out as an adhoc payment in the first week of next month after deducting there from recoveries on account of advances, interest, retention money, income tax etc. The balance payment due will be paid thereafter.
- iv) No interim payment will be admitted until such time the Contractor have fully complied with the requirement of the Condition no.8 (g) and 8 (h) concerning submission and approval of Network Schedule for the works, as detailed in Condition 8 (h). A fixed sum shall be held in abeyance at the time of next interim payment for non-attainment of each milestone in the network and shall be released only on attainment of the said milestone.
- v) An interim certificate given relating to work done or material delivered may be modified or corrected by a subsequent interim certificate or by the final certificate. No certificate of

the Engineer supporting an interim payment shall of itself be conclusive evidence that any work or materials to which it relates is / are in accordance with the contract.

82. Banning/De-Registration of Agencies of Construction works in BMC

- The regulations regarding Demotion/ Suspension Banning for specific period or permanently / De-Registration shall be governed as per the respective condition in Contractor Registration Rules of BMC.

83. JOINT VENTURE

~~———— In case if Joint Venture is allowed for the Project, the guidelines for JV as follows shall be incorporated in the Tender Document:~~

- ~~a) Providing and laying sewer line by Microtunneling /HDD method is complex technical work, hence the Joint venture (JV) for this tender is allowed.~~
- ~~b) Separate identity/name shall be given to the Joint Venture firm.~~
- ~~c) Number of members in a JV firm shall not be more than two.~~
- ~~d) A member of JV firm shall not be permitted to participate either in individual capacity or as a member of another JV firm in the same tender.~~
- ~~e) The tender form shall be purchased and submitted in the 'name of the JV firm or any constituent member of the JV.~~
- ~~f) Normally EMD shall be submitted only in the name of the JV and not in the name of constituent member. However, EMD in the name of lead partner can be accepted subject to submission of specific request letter from lead partner stating the reasons for not submitting the EMD in the name of JV and giving written confirmation from the JV partners to the effect that the EMD submitted by the lead partner may be deemed as EMD submitted by JV firm.~~
- ~~g) One of the members of the JV firm shall be the lead member of the JV firm who shall have a majority (at least 51%) share of interest in the JV firm. The other members shall have a share of not less than 26%.~~

~~It in case of JV firms with up to three members and not less than 10% each in case of JV firms with more than three members. In case of JV firm with foreign member(s), the lead member has to be an Indian firm with a minimum share of 51%.~~
- ~~h) One of the members of the JV firm shall be the lead member of the JV firm who shall have a majority (at least 51%) share of interest in the JV firm. The other member shall have a share of not less than 26%.~~

- ~~i) In case of JV firm with foreign member(s), the lead member has to be an Indian firm with a minimum share of 51%. Once the tender is submitted, the agreement shall not be modified/ altered/ terminated during the validity of the tender. In case the tenderer fails to observe/ comply with this stipulation, the full Earnest Money Deposit (EMD) shall be forfeited. In case of successful tenderer, the validity of this agreement shall be extended till the currency of the contract expires.~~
- ~~j) Once the tender is submitted, the agreement shall not be modified/ altered/ terminated during the validity of the tender. Joint Venture members shall not sell / transfer / alter their stakes / share in the Joint Venture during entire validity of the contract including extended period and the Defect Liability Period. In case the tenderer fails to observe/ comply with this stipulation, the full Earnest Money Deposit (EMD) shall be forfeited. In case of successful tenderer, the validity of this agreement shall be extended till the currency of the contract expires.~~
- ~~k) Similarly, after the contract is awarded, the constitution of JV firm shall not be allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. Failure to observe this stipulation shall be deemed to be breach of contract with all consequential penal action as per contract condition.~~
- ~~l) On award of contract to a JV firm, a single Performance Guarantee shall be required to be submitted by the JV firm as per tender conditions. All the Guarantees like Performance Guarantee, Bank Guarantee for Mobilization advance, machinery Advance etc. shall be accepted only in the name of the JV firm and no splitting of guarantees amongst the members of the JV firm shall be permitted.~~
- ~~m) On issue of LOA, an agreement among the members of the JV firm (to whom the work has been awarded) has to be executed and got registered before the Registrar of the Companies under Companies Act or before the Registrar / Sub Registrar under the Registration Act, 1908. This agreement shall be submitted by the JV firm to the BMC before signing the contract agreement for the work. (This agreement format should invariably be part of the tender condition). In case the tenderer fails to observe/ comply with this stipulation, the full Earnest Money Deposit (EMD) shall be forfeited and other penal actions due shall be taken against partners of the JV and the JV. This joint venture agreement shall have, inter alia, following clauses:-~~
- ~~i. **Joint and several liability** The members of the JV firm to which the contract is awarded, shall be jointly and severally liable to the Employer (BMC) for execution of the project in accordance with General and Special conditions of the contract.~~

~~The JV members shall also be liable jointly and severally for the loss, damages caused to the BMC during the course of execution of the contract or due to no execution of the contract or part thereof.~~

~~ii. — **Duration of the Joint Venture Agreement** It shall be valid during the entire period of the contract including the period of extension if any and the maintenance period after the work is completed.~~

~~iii. — **Governing Laws** The Joint Venture Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.~~

~~iv. — **Authorized Member** Joint Venture members shall authorize one of the members on behalf of the Joint Venture firm to deal with the tender, sign the agreement or enter into contract in respect of the said tender, to receive payment, to witness joint measurement of work done, to sign measurement books and similar such action in respect of the said tender/contract. All notices/correspondences with respect to the contract would be sent only to this authorized member of the JV firm.~~

~~No member of the Joint Venture firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other members and that of the employer in respect of the said tender/contract.~~

~~**n. Documents to be enclosed by the JV firm along with the tender:**~~

~~i. — In case one or more of the members of the JV firm is/are partnership firm(s), following documents shall be submitted:~~

~~a. — Notary certified copy of the Partnership Deed,~~

~~b. — Consent of all the partners to enter into the Joint Venture Agreement on a stamp paper of appropriate value (in original).~~

~~c. — Power of Attorney (duly registered as per prevailing law) in favor of one of the partners to sign the MOU and JV Agreement on behalf of the partners and create liability against the firm.~~

~~ii. — In case one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:~~

~~a. — Affidavit on Stamp Paper of appropriate value declaring that his Concern is a Proprietary Concern and he is sole proprietor of the Concern OR he is in position of "KARTA" of Hindu Undivided Family and he has the authority, power and consent given by other partners to act on behalf of HUF.~~

~~iii. — In case one or more members is/are limited companies, the following documents shall be submitted:~~

- ~~a. Notary certified copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement, authorizing MD or one of the Directors or Managers of the Company to sign MOU, JV Agreement, such other documents required to be signed on behalf of the Company and enter into liability against the company and/or do any other act on behalf of the company.~~
- ~~b. Copy of Memorandum and articles of Association of the Company.~~
- ~~e. Power of Attorney (duly registered as per prevailing law) by the Company authorizing the person to do/act mentioned in the para (a) above.~~
- ~~o. All the members of the JV shall certify that they have not been black listed or debarred by BMC from participation in tenders/contract in the past either in their individual capacity or the JV firm or partnership firm in which they were members / partners.~~
- ~~**p. Credentials & Qualifying criteria: Technical and financial eligibility of the JV firm shall be adjudged based on satisfactory fulfillment of the following criteria:**~~

~~**Technical eligibility criteria: The Lead member of the JV firm shall meet at least 51% requirement of technical capacity as stipulated in tender document.**~~

~~**In such cases, what constitutes a component in a composite work shall be clearly defined as part of the tender condition without any ambiguity.**~~

~~**Financial eligibility criteria:** The contractual payments received by the JV firm or the arithmetic sum of contractual payments received by all the members of JV firm in any one of the previous three financial years and shall be at least **100% of the estimated value** of the work as mentioned in the tender.~~

~~**Conflict of Interest :-**~~

- ~~a) The tenderer shall not have a conflict of interest (the “Conflict of Interest”) that affects the Bidding Process. Any tenderer found to have a Conflict of Interest shall be disqualified. The tenderer shall be deemed to have a Conflict of Interest that affects the Bidding Process, if:
 - ~~(i) The tenderer, its Member or Associate (or any constituent thereof) and any other tenderer, its Member or Associate (or any constituent thereof) have common controlling shareholders or other ownership interest; provided that this disqualification shall not apply in cases where the direct or indirect shareholding of the tenderer, its Member or an Associate thereof (or any shareholder thereof) having a shareholding of more than 25% (twenty five) percent of the paid up and subscribed share capital of such tenderer, Member or Associate (as the case may~~~~

~~be) in the other Tenderer, its Member or Associate is less than 25% (twenty five) percent of the subscribed and paid up equity share capital thereof; provided further that this disqualification shall not apply to any ownership by a bank, insurance company, pension fund or a public institution referred to in section 4A of the Companies Act 1956. For the purposes of eligibility of tenderer, indirect shareholding held through one or more intermediate persons shall be computed as follows:~~

~~(aa) where any intermediary is controlled by a person through management control or otherwise, the entire shareholding held by such controlled intermediary in any other person (the "Subject Person") shall be taken into account for computing the shareholding of such controlling person in the Subject Person; and~~

~~(bb) subject always to sub clause (aa) above, where a person does not exercise control over an intermediary, which has shareholding in the Subject person shall be under taken on a proportionate basis; provided however, that not such shareholding shall be reckoned under this sub clause (bb) if the shareholding of such person in the intermediary is less than 26% of the subscribed and paid up equity share holding on such intermediary;~~

~~or~~

~~(ii) a constituent of such tenderer is also a constituent of another tenderer;~~

~~or~~

~~(iii) such tenderer receives or has received any direct or indirect subsidy, grant, concessional loan or subordinated debt from any other tenderer, or any Associate thereof or has provided any such subsidy, grant, concessional loan or subordinated debt to any other tenderer, its Member or any Associate thereof;~~

~~or~~

~~(iv) Such tenderer has the same legal representative for purposes of this tender as any other tenderer;~~

~~or~~

~~(v) Such tenderer, or any Associate thereof has a relationship with another tenderer, or any Associate thereof, directly or through common third party / parties, that puts either or both of them in a position to have access to each others' information about, or to influence the tender of either or each other;~~

~~or~~

~~(vi) Such tenderer or any Associate thereof has participated as a consultant to the BMC in the preparation of any documents, design or technical specifications of the Project.~~

~~b) The tenderer shall be liable for disqualification if any legal, financial or technical advisor of the BMC in relation to the Project is engaged by the tenderer, its Member or any Associate thereof, as the case maybe, in any manner for matters related to or incidental to the Project. For the avoidance of doubt, this disqualification shall not apply where such advisor was engaged by the tenderer, its Member or Associate in the past but its assignment expired or was terminated 6 (six) months prior to the date of issue of this tender. Nor will this disqualification apply where such advisor is engaged after a period of 3 (three) years from the date of commercial operation of the Project .Explanation: In case the tenderer is a Consortium, then the term tenderer as used in Clause 'Joint Venture' shall include each Member of such Consortium.~~

84. To allow MoU:

MoU is allowed as stated:

- a) The bidder should submit memorandum of Understanding(MoU) with a firm and the firm should have laying experience as per the requirement given in “similar experience” i.e. either in his own capacity or as an officially approved contractor.
- b) The tenderer has to submit all the credentials of the firm with whom they are entering with MoU.

85 Compensation for delay:

If the Contractor fails to complete the works and clear the site on or before the Contract or extended date(s) / period(s) of completion, he shall, without prejudice to any other right or remedy of Municipal Corporation on account of such breach, pay as agreed compensation, amount calculated as stipulated below (or such smaller amount as may be fixed by the Engineer) on the contract value of the whole work or on the contract value of the time or group of items of work for which separate period of completion are given in the contract and of which completion is delayed for every week that the whole of the work of item or group of items of work concerned remains uncompleted, even though the contract as a whole be completed by the contract or the extended date of completion. For this purpose the term ‘Contract Value’ shall be the value of the work at Contract Rates as ordered including the value of all deviations ordered:

- Completion period for projects (originally stipulated or as extended) not exceeding 6 months :**to the extent of maximum 1 percent per week.**
- Completion period for projects (originally stipulated or as extended) exceeding 6 months and not exceeding 2 years: **to the extent of maximum ½ percent per week.**

- Completion period for projects (originally stipulated or as extended) exceeding 2 years :**to the extent of maximum ¼ percent per week.**

When the delay is not a full week or in multiple of a week but involves a fraction of a week the compensation payable for that fraction shall be proportional to the number of days involved.

Provided always that the total amount of compensation for delay to be paid this condition shall not exceed the undernoted percentage of the Contract Value of the item or group of items of work for which a separate period of completion is given.

- Completion period (as originally stipulated or as extended) not exceeding 6 months: **10 percent.**
- Completion period (as originally stipulated or as extended) exceeding 6 months and not exceeding 2 years: **7½ percent.**
- Completion period (as originally stipulated or as extended) exceeding 2 years : **5 percent.**

The amount of compensation may be adjusted set off against any sum payable to the contractor under this or any other contract with the Municipal Corporation.

85. Action and Compensation Payable In Case Of Bad Work and Not Done As Per Specifications

All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer-in-charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Vigilance Department of the BMC or any organization engaged by the BMC for Quality Assurance and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for that purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

If it shall appear to the Engineer-in-charge or his authorized subordinates in-charge of the work or to the officer of Vigilance Department, that any work has been executed with unsound, imperfect or unskillful workmanship or with materials of any inferior description,

or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted for or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve months of the completion of the work from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer-in-Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as under clause 8.e. of the general condition of contract in section 9 of tender document (for Compensation for delay) for this default. In such case the Engineer-in Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the Engineer in charge may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.

If the penalisation amount exceeds maximum limit with respect to Clause 8.e of Standard General Conditions of Contract, then a show cause notice shall necessarily be issued to the contract as to why the contract should not be terminated.

The above clause is summarized to make it easy to understand as follows:

1. *The Engineer-in-charge shall issue notice to the contractor for rectifying the defects or redoing of the work if necessary, within specific time to achieve the desired quality and quantity of the work and this should be governed by clause 8.f and 9.b of Standard General Conditions of Contract.*
2. *If the contractor fails to comply the same, only then, the contractor shall be liable to pay compensation at the same rate as under clause 8.e of the Standard General Condition of Contract (for Compensation for delay) for this default.*
3. *If the penalization amount exceeds the maximum limit, then the contractor will be liable for being banned/ deregistered from business dealings with BMC and this shall be governed by relative provision in Registration Rules of BMC and Standard General Conditions of Contract.*

4. *This penalization shall be levied only on account of delay in work, unsound, imperfect or unskillful workmanship or with materials of any inferior description, or that any materials or articles provided by him for the execution of the work are unsound or of quality inferior to that contracted for or otherwise not in accordance with the contract.*

87. Contractors remain liable to pay compensation:

In any case in which any of the powers conferred upon the Engineer In-charge by the **relevant clauses** in documents that form a part of contract as exercised or is exercisable in the event of any future case of default by the Contractor, he is declared liable to pay compensation amounting to the whole of his security deposit. The liability of the Contractor for past and future compensation shall remain unaffected.

In the event of the Executive Engineer taking action against these **relevant clauses**, he may, if he so desires, take possession of all or any tools and plant, materials and stores in or upon the work of site thereof or belonging to the Contractor or procured by him and intended to be used for the execution of the work or any part thereof paying or allowing for the same in account at the contract rates, or in the case of contract rates not being applicable at current market rates to be certified by the Executive Engineer, may after giving notice in writing to the Contractor or his staff of the work or other authorized agent require him to remove such tools and plants, materials or stores from the premises within a time to be specified in such notice and in the event of the Contractor failing to comply with any such requisition, the Executive Engineer may remove them at the contractors expense of sell them by auction or private sell on account of the Contractor at his risk in all respects and certificate of the Executive Engineer as to the expense of any such removal and the amount of the proceeds an expense of any such sell be final and conclusive against the Contractor.

88. No Claim To Any Payment Or Compensation Or Alteration In Or Restriction Of Work

(a) If at any time after the execution of contract documents, the Engineer shall for any reason whatsoever, desires that the whole or any part of the works specified in the Tender should be suspended for any period or that the whole or part of the work should not be carried out, at all, he shall give to the Contractor a Notice in writing of such desire and upon the receipt of such notice, the Contractor shall forthwith suspend or stop the work wholly or in part as required after having due regard to the appropriate stage at which the work should be stopped or suspended so as not to cause any damage or injury the work already done or endanger the

safety thereof, provided that the decision of the Engineer as to the stage at which the work or any part of it could be or could have been safely stopped or suspended shall be final and conclusive against the contractor.

The Contractor shall have no claim to any payment or compensation whatsoever by reason of or in pursuance of any notice as aforesaid, on account of any suspension, stoppage or curtailment except to the extent specified hereinafter.

(b) Where the total suspension of Work Order as aforesaid continued for a continuous period exceeding 90 days the contractor shall be at liberty to withdraw from the contractual obligations under the contract so far as it pertains to the unexecuted part of the work by giving 10 days prior notice in writing to the Engineer within 30 days of the expiry of the said period of 90 days, of such intention and requiring the Engineering to record the final measurement of the work already done and to pay final bill. Upon giving such Notice, the Contractor shall be deemed to have been discharged from his obligations to complete the remaining unexecuted work under his contract. On receipt of such notice the Engineer shall proceed to complete the measurement and make such payment as may be finally due to the contractor within a period of 90 days from the receipt of such Notice in respect of the work already done by the contractor. Such payment shall not in any manner prejudice the right of the contractor to any further compensation under the remaining provisions of this clause.

(c) Where the Engineer required Contractor to suspend the work for a period in excess of 30 days at any time or 60 days in the aggregate, the Contractor shall be entitled to apply to the Engineer within 30 days of the resumption of the work after such suspension for payment of compensation to the extent of pecuniary loss suffered by him in respect of working machinery remained ideal on the site of on the account of his having an to pay the salary of wages and labour engaged by him during the said period of suspension provided always that the contractor shall not be entitled to any claim in respect of any such working machinery, salary or wages for the first 30 days whether consecutive or in the aggregate or such suspension or in respect of any such suspension whatsoever occasion by unsatisfactory work or any other default on his part, the decision of the Engineer in this regard shall be final and conclusive against the contractor.

89. Contractor to supply plant, ladder, scaffolding, etc and is liable for damages arising from non provision of lights, fencing, etc.

The Contractor shall supply at his own cost all material, plant, tools, appliances, implements, ladders, cordage, tackle scaffolding and temporary works requisite or proper for the proper

execution of the work, whether, in the original altered or substituted form and whether included in the specification of other documents forming part of the contract or referred to in these conditions or not and which may be necessary for the purpose of satisfying or complying with the requirements of the Eng-In-Charge as to any matter as to which under these conditions is entitled to be satisfied, or which is entitled to require together with the carriage therefore to and from the work.

The Contractor shall also supply without charge, the requisite number of person with the means and materials necessary for the purpose of setting out works and counting, weighing and assisting in the measurements of examination at any time and from time to time of the work or materials, failing which the same may be provided by the Engineer In-charge at the expense of the contractor and the expenses may be deducted from any money due to the contractor under the contract or from his security deposit or the proceeds of sale thereof, or offers sufficient portion thereof.

The contractor shall provide all necessary fencing and lights required to protect the public from accident and shall also be bound to bear the expenses of defence of every suit, action or other legal proceedings, that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit action or proceedings to any such person or which may with the consent of the contractor be paid for compromising any claim by any such person.

90. Prevention of Fire:

The contractor shall not set fire to any standing jungle, trees, brushwood or grass without a written permit from the Engineer In-charge. When such permit is given, and also in all cases when destroying cut or dug up trees brushwood, grass, etc., by fire, the contractor shall take necessary measure to prevent such fire spreading to or otherwise damaging surrounding property. The Contractor shall make his own arrangements for drinking water for the labour employed by him.

- 91.** Compensation for all damages done intentionally or unintentionally by contractor's labour whether in or beyond the limits of BMC property including any damage caused by spreading the fire shall be estimated by the Engineer In-charge or such other officer as he may appoint and the estimate of the Engineer in-charge to the decision of the Dy. Chief Engineer on appeal shall be final and the contractor shall be bound to pay the amount of the assessed compensation on demand failing which the same will be recovered from the Contractor as damages or deducted by the Engineer In-charge from any sums that may be

due or become due from BMC to contractor under this Contract or otherwise. Contractor shall bear the expenses of defending any action or other legal proceedings that may be brought to prevent the spread of fire and he shall pay any damages and costs that may be awarded by the Court in consequence.

92. In the case of Tender by partners, any change in the constitution of the firm shall be forthwith, notified by the contractor through the Engineer In-charge for his information.

93. Action where no specifications:

In the case of any class of work for which there is no such specifications, such works shall be carried out in accordance with the specifications and in the event of there being no such specifications, then in such case, the work shall be carried out in all respects in accordance with all instructions and requirements of the Engineer In-charge.

94. Safety and medical help:

(i) The Contractor shall be responsible for and shall pay the expenses of providing medical help to any workmen who may suffer a bodily injury as a result of an accident. If such expenses are incurred by BMC, the same shall be recoverable from the contractor forthwith and be included without prejudice to any other remedy of BMC from any amount due or that may become due to the Contractor.

(ii) The contractor shall provide necessary personal safety equipment and first-aid box for the use of persons employed on the site and shall maintain the same in condition suitable for immediate use at any time.

(iii) The workers shall be required to use the safety equipments so provided by the contractor and the contractor shall take adequate steps to ensure the proper use of equipments by those concerned.

(iv) When the work is carried on in proximity to any place where there is risk or drawing all necessary equipments shall be provided and kept ready for use and all necessary steps shall be taken for the prompt rescue of any person in danger.

95. No compensation shall be allowed for any delay caused in the starting of the work on account of acquisition of land or in the case of clearance of works, on account of any delay in according to sanction of estimates.

96. Anti-malaria and other health measures:

Anti-Malaria and other health measures shall be taken as directed by the Executive Health Officer of BMC. Contractor shall see that mosquitogenic conditions are created so as to keep vector population to minimum level. Contractor shall carry out anti-malaria measures in the area as per the guidelines issued by the Executive Health Officer of BMC from time to time.

In case of default, in carrying out prescribed anti-malaria measures resulting in increase in malaria incidence, contractor shall be liable to pay BMC on anti-malaria measures to control the situation in addition to fine.

SECTION - 10
SPECIFICATIONS
& SELECTION OF MATERIAL

SPECIFICATIONS & SELECTION OF MATERIAL

The tender is prepared on the basis of Unified Schedule of Rates and specifications 2013 and USOR-R2-2018 for Sewerage Project department. The specifications of the items of USOR are available on BMC portal <http://portal.mcgm.gov.in> under the Tender tab. Hence the deserving contractor shall either download the same from BMC portal or the same may be collected in the soft copy format at the time of purchasing the tender from this office.

SELECTION OF MATERIAL

1. All materials brought on the site of work and meant to be used in the same, shall be the best of their respective kinds and to the approval of the Engineer. The Engineer or his representative will accept that the materials are really the best of their kinds, when it is proved beyond doubt that no better materials of the particular kind in question are available in the market.
2. The contractor shall obtain the approval of the Engineer of samples of all materials to be used in the works and shall deposit these samples with him before placing an order for the materials with the suppliers. The materials brought on the works shall conform in every respect to their approved samples. Fresh samples shall be deposited with the Engineer whenever the type or source of any material changes.
3. The contractor shall check each fresh consignment of materials as it is brought to the site of works to see that they conform in all respects to the Specifications of the samples approved by the Engineer, or both.
4. The Engineer will have the option to have any of the materials tested to find out whether they are in accordance with the Specifications and the Contractor will bear all expenses for such testing. All bills, vouchers and test certificates, which in the opinion of the Engineer or his representative are necessary to convince him as to the quality of the materials or their suitability shall be produced for his inspection when required.
5. Any materials that have not been found to conform to the specifications will be rejected forthwith and shall be removed from the site by the contractor at his own cost within 24 hours.
6. The Engineer shall have power to cause the Contractors to purchase and use such materials from any particular source, as may in his opinion be necessary for the proper execution of the work.
7. Notwithstanding the source, the sand shall be washed using sand washing machine before use.

SECTION - 11

FRAUD

AND

CORRUPT

PRACTICES

FRAUD AND CORRUPT PRACTICES

- The Applicants and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Bidding Process. Notwithstanding anything to the contrary contained herein, the Authority may reject an Application without being liable in any manner whatsoever to the Applicant if it determines that the Applicant has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Bidding Process.
- Without prejudice to the rights of the Authority under relevant Clause hereinabove, if an Applicant is found by the Authority to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Bidding Process, such Applicant shall not be eligible to participate in any tender or RFQ issued by the Authority during a period of 2 (two) years from the date such Applicant is found by the Authority to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as the case may be.
- For the purposes of this Clause , the following terms shall have the meaning hereinafter respectively assigned to them:

A. “corrupt practice” means

the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the actions of any person connected with the Bidding Process (for avoidance of doubt, offering of employment to, or employing, or engaging in any manner whatsoever, directly or indirectly, any official of the Authority who is or has been associated in any manner, directly or indirectly, with the Bidding Process or the LOA or has dealt with matters concerning the Concession Agreement or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the Authority, shall be deemed to constitute influencing the actions of a person connected with the Bidding Process); or

save and except as permitted under the relevant sub clause, engaging in any manner whatsoever, whether during the Bidding Process or after the issue of the LOA or after the execution of the Concession Agreement, as the case may be, any person in respect of any matter relating to the Project or the LOA or the Concession Agreement, who at any time has been or is a legal, financial or technical adviser of the Authority in relation to any

matter concerning the Project;

- B. “fraudulent practice”** means a misrepresentation or omission of facts or suppression of facts or disclosure of incomplete facts, in order to influence the Bidding Process ;
- C. “coercive practice”** means impairing or harming or threatening to impair or harm, directly or indirectly, any person or property to influence any persons participation or action in the Bidding Process;
- D. “undesirable practice”** means (i) establishing contact with any person connected with or employed or engaged by the Authority with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Bidding Process; or (ii) having a Conflict of Interest; and
- E. “Restrictive practice”** means forming a cartel or arriving at any understanding or arrangement among Applicants with the objective of restricting or manipulating a full and fair competition in the Bidding Process.
- F.** If the Employer/Financier determines that the Contractor has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days’ notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of relevant Clause shall apply as if such expulsion had been made.
- G.** Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Works, then that employee shall be removed in accordance with relevant Clause.

For the purposes of this Sub-Clause:

- i. “corrupt practice” is the offering, giving, receiving to soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
- ii. “another party” refers to a public official acting in relation to the procurement process or contract execution. In this context, “public official” includes Financer staff and employees of other organizations taking or reviewing procurement decisions.
- iii. “fraudulent practice” is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

- iv. “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
- v. “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- vi. “obstructive practice” is deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede the Financier investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
- vii. acts intended to materially impede the exercise of the Financier’s inspection and audit rights provided .
- viii. “party” refers to a public official; the terms “benefit” and “obligation” relate to the procurement process or contract execution; and the “act or omission” is intended to influence the procurement process or contract execution.
- ix. ”parties” refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, noncompetitive levels.
- x. a “party” refers to a participant in the procurement process or contract execution.

SECTION - 12
LIST OF APPROVED BANKS

LIST OF APPROVED BANKS

1. The following Banks with their branches in Greater Mumbai and in suburbs and extended suburbs up to Virar and Kalyan have been approved only for the purpose of accepting Banker's guarantee from 1997-98 onwards until further instructions.
2. The Bankers Guarantee issued by branches of approved Banks beyond Kalyan and Virar can be accepted only if the said Banker's Guarantee is countersigned by the Manager of a branch of the same Bank, within the Mumbai Limit categorically endorsing thereon that said bankers Guarantee is binding on the endorsing Branch of the bank within Mumbai limits and is liable to be enforced against the said branch of the Bank in case of default by the contractor/supplier furnishing the bankers Guarantee.

List of approved Banks:-

List of Scheduled Commercial Banks (SCBs)

List of Scheduled Public Sector Banks	
Sr.No.	Name of the Bank
1.	Bank of Baroda
2.	Bank of India
3.	Bank of Maharashtra
4.	Canara Bank
5.	Central Bank of India
6.	Indian Bank
7.	Indian Overseas Bank
8.	Punjab & Sind Bank
9.	Punjab National Bank
10.	State Bank of India
11.	UCO Bank
12.	Union Bank of India

List of Scheduled Private Sector Banks

Sr.No.	Name of the Bank
1.	Axis Bank Ltd.
2.	Bandhan Bank Ltd.
3.	CSB Bank Ltd.
4.	City Union Bank Ltd.
5.	DCB Bank Ltd.
6.	Dhanlaxmi Bank Ltd.
7.	Federal Bank Ltd.
8.	HDFC Bank Ltd
9.	ICICI Bank Ltd.
10.	IndusInd Bank Ltd
11.	IDFC First Bank Ltd.
12.	Jammu & Kashmir Bank Ltd.
13.	Karnataka Bank Ltd.
14.	Karur Vysya Bank Ltd.
15.	Kotak Mahindra Bank Ltd
16.	Lakshmi Vilas Bank Ltd.
17.	Nainital Bank Ltd.
18.	RBL Bank Ltd.
19.	South Indian Bank Ltd.
20.	Tamilnad Mercantile Bank Ltd.
21.	YES Bank Ltd.
22.	IDBI Bank Ltd.

List of Scheduled Small Finance Banks	
Sr.No.	Name of the Bank
1.	Au Small Finance Bank Limited
2.	Capital Small Finance Bank Limited
3.	Equitas Small Finance Bank Limited
4.	Suryoday Small Finance Bank Limited
5.	Ujjivan Small Finance Bank Limited
6.	Utkarsh Small Finance Bank Limited
7.	ESAF Small Finance Bank Limited
8.	Fincare Small Finance Bank Limited
9.	Jana Small Finance Bank Limited
10.	North East Small Finance Bank Limited
List of Scheduled Payments Banks	
Sr.No.	Name of the Bank
1.	India Post Payments Bank Limited
List of Scheduled Regional Rural Banks	
Sr No	Name of the RRB
1.	Andhra Pragathi Grameena Bank
2.	Chaitanya Godavari Grameena Bank
3.	Saptagiri Grameena Bank
4.	Andhra Pradesh Grameena Vikas Bank
5.	Telangana Grameena Bank
6.	Arunachal Pradesh Rural Bank
7.	Uttar Bihar Gramin Bank

8.	Chhattisgarh Rajya Gramin Bank
9.	Saurashtra Gramin Bank
10.	Sarva Haryana Gramin Bank
11.	Himachal Pradesh Gramin Bank
12.	Ellaquai Dehati Bank
13.	J&K Grameen Bank
14.	Karnataka Vikas Grameena Bank
15.	Madhyanchal Gramin Bank
16.	Vidharbha Konkan Gramin Bank
17.	Maharashtra Gramin Bank
18.	Manipur Rural Bank
19.	Meghalaya Rural Bank
20.	Mizoram Rural Bank
21.	Nagaland Rural Bank
22.	Utkal Grameen bank
23.	Odisha Gramya Bank
24.	Puduvai Bharathiar Grama Bank
25.	Baroda Rajasthan Kshetriya Gramin Bank
26.	Rajasthan Marudhara Gramin Bank
27.	Tripura Gramin Bank
28.	Uttarakhand Gramin Bank
29.	Bangiya Gramin Vikas Bank
30.	Paschim Banga Gramin Bank
31.	Uttarbanga Kshetriya Gramin Bank

32.	Kerala Gramin Bank
33.	Assam Gramin Vikash Bank
34.	Baroda Gujarat Gramin Bank
35.	Dakshin Bihar Gramin Bank
36.	Punjab Gramin Bank
37.	Jharkhand Rajya Gramin Bank
38.	Karnataka Gramin Bank
39.	Madhya Pradesh Gramin Bank
40.	Tamil Nadu Grama Bank
41.	Aryavart Bank
42.	Prathama UP Gramin Bank
43.	Baroda UP Bank*
<p>NOTE: * The process for Baroda UP Bank at Serial no 43, for inclusion in the Second Schedule of RBI Act, 1934, is yet to be completed.</p>	

List of Scheduled Foreign Banks in India	
Sr.No.	Name of the Bank
1.	Australia and New Zealand Banking Group Ltd.
2.	Westpac Banking Corporation
3.	Bank of Bahrain & Kuwait BSC
4.	AB Bank Ltd.
5.	Sonali Bank Ltd.
6.	Bank of Nova Scotia
7.	Industrial & Commercial Bank of China Ltd.
8.	BNP Paribas

9.	Credit Agricole Corporate & Investment Bank
10.	Societe Generale
11.	Deutsche Bank
12.	HSBC Ltd
13.	PT Bank Maybank Indonesia TBK
14.	Mizuho Bank Ltd.
15.	Sumitomo Mitsui Banking Corporation
16.	The Bank of Tokyo- Mitsubishi UFJ, Ltd.
17.	Cooperatieve Rabobank U.A.
18.	Doha Bank
19.	Qatar National Bank
20.	JSC VTB Bank
21.	Sberbank
22.	United Overseas Bank Ltd
23.	FirstRand Bank Ltd
24.	Shinhan Bank
25.	Woori Bank
26.	KEB Hana Bank
27.	Industrial Bank of Korea
28.	Kookmin Bank
29.	Bank of Ceylon
30.	Credit Suisse A.G
31.	CTBC Bank Co., Ltd.
32.	Krung Thai Bank Public Co. Ltd.

33.	Abu Dhabi Commercial Bank Ltd.
34.	Mashreq Bank PSC
35.	First Abu Dhabi Bank PJSC
36.	Emirates Bank NBD
37.	Barclays Bank Plc.
38.	Standard Chartered Bank
39.	NatWest Markets Plc
40.	American Express Banking Corporation
41.	Bank of America
42.	Citibank N.A.
43.	J.P. Morgan Chase Bank N.A.
44.	SBM Bank (India) Limited*
45.	DBS Bank India Limited*
46.	Bank of China Ltd.

[* Note: SBM Bank (India) Limited (Subsidiary of SBM Group) and DBS Bank India Limited (Subsidiary of DBS Bank Ltd.) have been issued licence on December 06, 2017 and October 04, 2018 respectively for carrying on banking business in India through Wholly Owned Subsidiary (WOS) mode. They have commenced operations as WOS with effect from December 01, 2018 and March 01, 2019.]

SECTION - 13
APPENDIX

FORM OF TENDER

To,
The Municipal Commissioner for Greater Mumbai
Sir,

I/ We have read and examined the following documents relating to the construction of

- i. Notice inviting tender.
- ii. Directions to tenderers (General and special)
- iii. General condition of contract for Civil Works of the Municipal Corporation of Greater Mumbai as amended up to date.
- iv. Relevant drawings
- v. Specifications.
- vi. Special directions
- vii. Annexure A and B.
- viii. Bill of Quantities and Rates.

1A. I/We _____

(full name in capital letters, starting with surname), the Proprietor/ Managing Partner/ Managing Director/ Holder of the Business, for the establishment / firm / registered company, named herein below, do hereby offer to

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Referred to in the specifications and schedule to the accompanying form of contract of the rates entered in the schedule of rates sent herewith and signed by me/ us” (strike out the portions which are not applicable).

1B. I/We do hereby state and declare that I/We, whose names are given herein below in details with the addresses, have not filled in this tender under any other name or under the name of any other establishment /firm or otherwise, nor are we in any way related or concerned with the establishment /firm or any other person, who have filled in the tender for the aforesaid work.”

2. I/We hereby tender for the execution of the works referred to in the aforesaid documents, upon the terms and conditions, contained or referred to therein and in accordance with the specifications designs, drawings and other relevant details in all respects.

* At the rates entered in the aforesaid Bill of Quantities and Rates.

3. According to your requirements for payment of Earnest Money amounting to Rs. _____ /-(Rs.

_____)

I/We have deposited the amount through online payment gateways with the C.E. of the Corporation not to bear interest

4. I/We hereby request you not to enter into a contract with any other person/s for the execution of the works until notice of non/acceptance of this tender has first been communicated to me/us, and in consideration of yours agreeing to refrain from so doing I/we agree not to withdraw the offer constituted by this tender before the date of communication to me/us of such notice of non/acceptance, which date shall be not later than ten days from the date of the decision of the Standing Committee or Education Committee of the Corporation, as maybe required under the Mumbai Municipal Corporation Act, not to accept this tender.(Subject to condition 5 below).
5. I/We also agree to keep this tender open for acceptance for a period of 180 days from the date fixed for opening the same and not to make any modifications in its terms and conditions which are not acceptable to the Corporation.
6. I/We agree that the Corporation shall, without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely, if.
- a. I/We fail to keep the tender open as aforesaid.
 - b. I/We fail to execute the formal contract or make the contract deposit when called upon to do so.
 - c. I/we do not commence the work on or before the date specified by the Engineer in his work order.
7. I/We hereby further agree to pay all the charges of whatsoever nature in connection with the preparation, stamping and execution of the said contract.
8. I/We further agree that, I/we shall register ourselves as 'Employer' with the Bombay Iron and Steel Labour Board' and fulfill all the obligatory provisions of Maharashtra Mathadi, Hamal and other Manual workers (Regulation of Employment and Welfare) Act 1969 and the Bombay Iron and Steel unprotected workers Scheme 1970.
9. "I/We..... have failed in the accompanying tender with full knowledge of liabilities and, therefore, we will not raise any objection or dispute in any manner relating to any action, including forfeiture of deposit and blacklisting, for giving any information, which is found to be incorrect and against the instructions and directions given in this tender.

10. "I/We further agree and undertake that in the event it is revealed subsequently after the allotment of work/contract to me/us, that any information given by me/us in this tender is false or incorrect, I/We shall compensate the Municipal Corporation of Greater Mumbai for any such losses or inconvenience caused to the Corporation in any manner and will not resist any claim for such compensation on any ground whatsoever. I/we agree and undertake that I/we shall not claim in such case any amount by way of damages or compensation for cancellation of the contract given to me/us or any work assigned to me/us or is withdrawn by the Corporation,"

Address

Yours

faithfully,

.....

.....

Digital Signature of the Tenderer or

the Firm

1.....

2.....

3.....

4.....

5.....

Full Name and private residential address
of all the partners constituting the Firm

A/c No.

.....

1. Name of Bank

2.

3. Name of Branch

4.

5. Vender No.

AGREEMENT FORM

Tender / Quotation

dated 20...

Standing Committee/Education Committee Resolution No.

CONTRACT FOR THE WORKS

.....
.....
.....
.....

This agreement made this day of

Two thousand

..... Between

.....
.....
.....

inhabitants of Mumbai, carrying on business at.....

.....
.....

in Bombay under the style and name of Messrs

.....
..... (Hereinafter called “the contractor of the one part and Shri

.....
.....

the DMC (E) (hereinafter called “the commissioner” in which expression are included unless the inclusion is inconsistent with the context, or meaning thereof, his successor or successors for the time being holding the office of DMC (E) of the second part and the Municipal Corporation of Greater Mumbai (hereinafter called “the Corporation”) of the third part, WHEREAS the contractor has tendered for the construction, completion and maintenance of the works described above and his tender has been accepted by the Commissioner (with the approval of the Standing Committee/Education Committee of the Corporation NOW THIS

THIS AGREEMENT WITNESSETH as follows:-

- 1) In this agreement words and expressions shall have the same meanings as are respectively assigned to them in the General Conditions of Contract for works hereinafter referred to:-

- 2) The following documents shall be deemed to form and be read and constructed as a part of this agreement viz.
 - a. The letter of Acceptance
 - b. The Bid:
 - c. Addendum to Bid; if any
 - d. Tender Document
 - e. The Bill of Quantities:
 - f. The Specification:
 - g. Detailed Engineering Drawings
 - h. Standard General Conditions of Contracts (GCC)
 - i. All correspondence documents between bidder and BMC
- 3) In consideration of the payments to be made by the Commissioner to the contractor as hereinafter mentioned the contractor hereby covenants with the Commissioner to construct, complete and maintain the works in conformity in all respects with the provision of the contract.
- 4) The Commissioner hereby covenants to pay to the Contractor in consideration of the construction, completion and maintenance of the works the contract sum, at times and in the manner prescribed by the contract.

IN WITNESS WHERE OF the parties hereto have caused their respective common seals to be herein to affixed (or have hereunto set their respective hands and seals) the day and year above written.

Signed, Sealed and delivered by the contractors

In the presence of

Trading under the name and style of

Full Name

Address

Contractors

Signed by the DMC (E) in the presence of

Ex. City/ WS/ ES

DMC (E)

The Common seal of the Municipal Corporation of Greater Mumbai was hereunto affixed on the 20 in the presence of two members of the Standing Committee.

1.

1.

2.

2.

And in the presence of the Municipal Secretary

Municipal Secretary

ANNEXURE " A "

Name of work : P/L 400 mm dia. (OD) HDPE pipe sewer line (PN-6 Class-PE 80 grade : IS 14333) to correct grade and alignment on North side of JVLR from W.E.H. to Pratap Nagar, Jogeshwari(E) in K/E Ward by HDD method.

Chief Engineer (_____)

1. The Engineer for this work :

Dy.Ch.Eng.(_____)

Exe.Eng.(_____)

2. **Estimated cost of Tender:**

Sr. No.	Description of work	Total Amount Rs.
1	Civil Work	4,31,52,100.00 /-
2	Electrical Work	
3	Total Amount	4,31,52,100.00 /-

3.	Earnest Money (1% of the Estimated cost)	4,31,600.00 /-
4.	Time Period	11 Months (Excluding Monsoon)
1.	Contract as a whole Period completion	
2.	Part or Groups of items	
	i)	i)
	ii)	ii)
	iii)	iii)

Percentage to be charged as supervision charges for the work got executed through other meanspercent.

The "Actual cost of the work" shall mean in the case of percentage rate contracts the actual cost of the work executed at the rates as mentioned in the Contract Schedule adjusted by the Contractor's percentage rate and cost of extra and excess, but excluding the

cost on account of Water Charges and Sewerage Charges if any, payable by the contractor and also excluding cost on account of price variation claims as provided in price variation clause as amended up to date.

In case of item rate contracts the actual cost calculated for the work executed at the rates mentioned in the contract schedule for different items including cost of excess and extra items of the work excluding the cost of water charges and sewerage charges if any, payable by the contractor and excluding cost on account of price variation claims as provided in extra excess conditions as amended up to date.

In case of lump sum contract the cost of the work actually carried out as per break up and programme of the work and the schedule of payment included in the contract including cost of any excess and/or extra items, of the work, excluding the cost on account of water charges and sewerage charges and also excluding cost on account of price variation claims as provided in extra excess conditions as amended up to date.

PRE-CONTRACT INTEGRITY PACT

The Bidder commits himself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of his bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commits himself to the following:-

1. The Bidder will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BMC, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the Contract.
2. The Bidder further undertakes that he has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BMC or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the Contract or any other Contract with the Government for showing or forbearing to show favour or disfavour to any person in relation to the Contract or any other Contract with the Government.
3. The Bidder will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.
4. The Bidder will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.
5. The Bidder, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payments he has made, is committed to or intends to make to officials of the BMC or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

6. The Bidder shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the BMC as part of the business relationship, regarding plans, technical proposals and business details, including information contained in any electronic data carrier. The Bidder also undertakes to exercise due and adequate care lest any such information is divulged.
7. The Bidder commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.
8. The Bidder shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.
9. The Bidder and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Bidding Process. Notwithstanding anything to the contrary contained herein, the Authority may reject an Application without being liable in any manner whatsoever to the Applicant if it determines that the Applicant has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Bidding Process

For the purposes of this Clause 9, the following terms shall have the meaning herein after respectively assigned to them:

1. “fraudulent practice” means a misrepresentation or omission of facts or suppression of facts or disclosure of incomplete facts, in order to influence the Bidding Process ;
2. “coercive practice” means impairing or harming or threatening to impair or harm, directly or indirectly, any person or property to influence any persons participation or action in the Bidding Process;
3. “undesirable practice” means (i) establishing contact with any person connected with or employed or engaged by the Authority with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Bidding Process; or (ii) having a Conflict of Interest; and
4. “restrictive practice” means forming a cartel or arriving at any understanding or arrangement among Applicants with the objective of restricting or manipulating a full and fair competition in the Bidding Process.

Signature of Tenderer / Bidder

Annexure- C

(On Rs. 500/- Stamp Paper)

DECLARATION CUM INDEMNITY BOND

I, _____ of _____, do hereby declared and undertake as under.

1. I declare that I have submitted certificates as required to Executive engineer (Monitoring) at the time of registration of my firm/company _____ and there is no change in the contents of the certificates that are submitted at the time of registration.
2. I declare that I _____ in capacity as Manager/Director/Partners/Proprietors of _____ has not been charged with any prohibitory and /or penal action such as banning(for specific time or permanent)/de-registration or any other action under the law by any Government and/or Semi Government and/or Government undertaking.
3. I declare that I have perused and examined the tender document including addendum, condition of contract, specifications, drawings, bill of quantity etc. forming part of tender and accordingly, I submit my offer to execute the work as per tender documents at the rates quoted by me in capacity as _____ of _____.
4. I further declare that if I am allotted the work and I failed to carry out the allotted work in accordance with the terms and conditions and within the time prescribed and specified, BMC is entitled to carry out the work allotted to me by any other means at my risk and cost, at any stage of the contract.
5. I also declare that I will not claim any charge/damages/compensation for non availability of site for the contract work at any time.
6. I declare that I will positively make the arrangements of the required equipment on the day of commencement or with respect to the progress of the work in phases, as per the instructions of site in charge

Signature of Tenderer / Bidder

BANKERS GURANTEE IN LIEU OF CONTRACT DEPOSIT

THIS INDENTURE made this _____ day of _____ BETWEEN

THE _____ BANK incorporated under the English/Indian Companies Acts and carrying on business in Mumbai (hereinafter referred to as 'the bank' which expression shall be deemed to include its successors and assigns)of the first part

_____ inhabitants carrying on business at _____ in Mumbai under the style and name of Messer's _____ (hereinafter referred to as 'the consultant') of the second part Shri. _____

THE MUNICIPAL COMMISSIONER FOR GREATER MUMBAI (hereinafter referred to as 'the commissioner' which expression shall be deemed, also to include his successor or successors for the time being in the said office of Municipal Commissioner) of the third part and THE MUNICIPAL CORPORATION OF GREATER MUMBAI (hereinafter referred to as 'the Corporation') of the fourth part WHEREAS the consultants have submitted to the Commissioner tender for the execution of the work of " _____ and the terms of such tender /contract require that the consultants shall deposit with the Commissioner as/contract deposit/ earnest money and /or the security a sum of Rs. _____ (Rupees _____)AND WHEREAS if and when any such tender is accepted by the Commissioner, the contract to be entered into in furtherance thereof by the consultants will provide that such deposit shall remain with and be appropriated by the Commissioner towards the Security -deposit to be taken under the contract and be redeemable by the consultants, if they shall duly and faithfully carry out the terms and provisions of such contract and shall duly satisfy all claims properly chargeable against them there under AND WHEREAS the consultants are constituents of the Bank and in order to facilitate the keeping of the accounts of the consultants, the Bank with the consent and concurrence of the consultants has requested the Commissioner to accept the undertaking of the Bank hereinafter contained, in place of the contractors depositing with the Commissioner the said sum as earnest money and /or security as aforesaid AND WHEREAS accordingly the Commissioner has agreed to accept such undertaking NOW THIS AGREEMENT WITNESSES that in consideration of the premises, the Bank at the request of the consultants (hereby testified) UNDERTAKES WITH the commissioner to pay to the commissioner upon demand in writing , whenever required by him , from time to time , so to do , a sum not exceeding in the whole Rs. _____ (Rupees _____)under the

terms of the said tender and /or the contract .The B.G. Is valid upto _____”Notwithstanding anything what has been stated above, our liability under the above guarantee is restricted to Rs. _____ only and guarantee shall remain in force upto _____ unless the demand or claim under this guarantee is made on us in writing on or before _____ all your right under the above guarantee shall be forfeited and we shall be released from all liabilities under the guarantee thereafter”

IN WITNESS WHEREOF

WITNESS(1) _____

Name and _____

address _____

WITNESS(2) _____

Name and _____ the duly constituted Attorney Manager

address _____

the Bank and the said Messer’s _____

_____ (Name of the Bank)

WITNESS(1) _____

Name and _____

address _____

WITNESS(2) _____

Name and _____

For Messer’s _____

address _____

have here into set their respective hands the day and year first above written.

The amount shall be inserted by the Guarantor, representing the Contract Deposit in Indian Rupees.

Annexure- D

Rate Analysis

Note : Rate analysis shall be submitted with respect to items mentioned in the respective BOQ for subject tender

Item Description

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-a	Excavation in all types of soils(for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc as directed by the engineer.The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming,etc complete, and measured from the edge of cutting including all lifts and stackingin layers and removing the surplus excavated materials as directed {Records to be maintained properly}.The rate also includes supporting public utilities such as cables,drains,pipe water mains, but shall not include the cost of shoring etc as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc. 2) It also includes the royalty and other taxes if any.	cum	10		
	Details of Cost for 10 cum				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.1		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	5.7		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			
E					
F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cu m			

Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				

4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-a	-do-do- as per item SE-1-1-a but with mechanical dewatering for lift from 2m to 4.0m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.2		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	7.980		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			
E					
F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cu m			

Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty		
R2-SE-1-1-b	-do-do- for lift from 4.0m to6m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.3		
LB	Labour				

LB-12	Labour for Excavation, Backfilling, etc	Day	11.172		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			

F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/pe er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-c	-do-do- for lift from 6.0m to8m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.4		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	13.406		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			
F	Total (C+D+E)				

G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty		
R2-SE-1-1-5	-do-do- for lift from 8.0m to 10m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.5		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	16.088		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			

F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty		
R2-SE-1-1-6	-do-do- for lift from 10m to 11m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				

HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.6		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	17.696		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost	Day			
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			
F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-7	-do-do- for lift from 11m to12m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.7		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	19.466		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost	Day			
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				

B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			
F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-8	-do-do- for lift from 12m to13m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.8		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	21.413		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost	Day			
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			
F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				

6 Total per unit Amount					
Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-9	-do-do- for lift from 13m to14m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	0.9		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	23.554		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		
A	Total Hire Charge & Labour cost	Day			
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			
F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-10	-do-do- for lift from 14m to15m	cum	10		
	Details of Cost for 10 cum				
	Lead of 150 m				
HC	Hire Charges				
HC-17	Loader	Day	0.041		
HC-81	10 Ton Vibro Roller for compaction	Day	0.008		
HC-02	Pumping out of Water by Dewatering Pump of 5HP	Day	1		
LB	Labour				
LB-12	Labour for Excavation, Backfilling, etc	Day	25.909		
LB-33	Mistry	Day	0.2		
LB-33	Supervisor	Day	0.1		

A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools and Plants=2% on A	%			
C	Total (A+B)				
D	Support of utilities =1% of C	%			
F	Total (C+D+E)				
G	5% Overheads & 10% Contractors Profit on Basic Amount on F	%			
	Total Cost (F+G+GST Amount)				
	Per Unit Cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-j	Extra over above for item no. SE-1-1 to SE-1-1-i for relevant lift of excavation in soft/ disintegrated rock, road carriageway, sand stone, stiff clay, gravel, cobblestone, hard laterite, water bound macadam, wet mix macadam, asphalt mix carpet of any type, pitching, soling, paths and hardcore, lime concrete, plain cement concrete, stone masonry and all types of brick/ block masonry below ground level	cum	10.00		
	Details of Cost for 10 cum				
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	0.25		
LB	Labour				
LB-12	Labour	Day	4.00		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per Unit Cost	Rs/cu m			

Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k	Extra over above for item no. SE-1-1 to SE-1-1-i for relevant lift of excavation in hard rock by controlled blasting with necessary safety precautions as per statutory requirement, including drilling, breaking in small pieces, mucking, dressing/ trimming the sides, leveling/ grading of bottoms, etc.	cum	10.00		
R2-SE-1-1-k-i	Calculating for total amount for 0m -2m depth				
	Details of Cost for : 10.00 Cum				
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.30		
HC-02	5 HP pump for dewatering	Day	0.10		
LB	LABOUR :				
LB-08	Excavators	Day	2.00		
LB-08	Breakers	Day	2.00		
LB-08	Hole drillers	Day	2.00		
LB-12	Coolie	Day	4.00		
LB-32	Semi Skilled Labour / Beldar	Day	1.00		
	MATERIALS				
MA-BLD- EW-1	Blasting Powder	Kg	6.42		
MA-BLD- EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				

4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k- ii	-item deleted-	cum	10.00		
	Details of Cost for : 10.00 Cum				
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.36		
HC-02	5 HP pump for dewatering	Day	0.20		
LB	LABOUR :				
LB-08	Excavators	Day	2.40		
LB-08	Breakers	Day	2.40		
LB-08	Hole drillers	Day	2.40		
LB-12	Coolie	Day	4.80		
LB-32	Semi Skilled Labour / Beldar	Day	1.20		
	MATERIALS				
MA-BLD- EW-1	Blasting Powder	Kg	6.42		
MA-BLD- EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
---------	-------------	--------------	-----	--------------------------	-----------------------------

R2-SE-1-1-k-iii	-do-do- for lift from 4.0m to6m				
	Details of Cost for : 10.00 Cum	cum	10.00		
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.43		
HC-02	5 HP pump for dewatering	Day	0.30		
LB	LABOUR :				
LB-08	Excavators	Day	2.88		
LB-08	Breakers	Day	2.88		
LB-08	Hole drillers	Day	2.88		
LB-12	Coolie	Day	5.76		
LB-32	Semi Skilled Labour / Beldar	Day	1.44		
	MATERIALS				
MA-BLD-EW-1	Blasting Powder	Kg	6.42		
MA-BLD-EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/pe er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k-iv	-do-do- for lift from 6m to8m				
	Details of Cost for : 10.00 Cum	cum	10.00		
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.52		
HC-02	5 HP pump for dewatering	Day	0.40		

LB	LABOUR :				
LB-08	Excavators	Day	3.46		
LB-08	Breakers	Day	3.46		
LB-08	Hole drillers	Day	3.46		
LB-12	Coolie	Day	6.91		
LB-32	Semi Skilled Labour / Beldar	Day	1.73		
	MATERIALS				
MA-BLD-EW-1	Blasting Powder	Kg	6.42		
MA-BLD-EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/pe er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k-v	-do-do- for lift from 8m to 10m				
	Details of Cost for : 10.00 Cum	cum	10.00		
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.62		
HC-02	5 HP pump for dewatering	Day	0.50		
LB	LABOUR :				
LB-08	Excavators	Day	4.15		
LB-08	Breakers	Day	4.15		
LB-08	Hole drillers	Day	4.15		
LB-12	Coolie	Day	8.29		
LB-32	Semi Skilled Labour / Beldar	Day	2.07		
	MATERIALS				

MA-BLD-EW-1	Blasting Powder	Kg	6.42		
MA-BLD-EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/pe er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k-vi	-do-do- for lift from 10m to 11m				
	Details of Cost for : 10.00 Cum	cum	10.00		
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.68		
HC-02	5 HP pump for dewatering	Day	0.60		
LB	LABOUR :				
LB-08	Excavators	Day	4.56		
LB-08	Breakers	Day	4.56		
LB-08	Hole drillers	Day	4.56		
LB-12	Coolie	Day	9.12		
LB-32	Semi Skilled Labour / Beldar	Day	2.28		
	MATERIALS				
MA-BLD-EW-1	Blasting Powder	Kg	6.42		
MA-BLD-EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				

	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/pe er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k-vii	-do-do- for lift from 11m to 12m				
	Details of Cost for : 10.00 Cum	cum	10.00		
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.75		
HC-02	5 HP pump for dewatering	Day	0.70		
LB	LABOUR :				
LB-08	Excavators	Day	5.02		
LB-08	Breakers	Day	5.02		
LB-08	Hole drillers	Day	5.02		
LB-12	Coolie	Day	10.04		
LB-32	Semi Skilled Labour / Beldar	Day	2.51		
	MATERIALS				
MA-BLD-EW-1	Blasting Powder	Kg	6.42		
MA-BLD-EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			

	Total (C+D+GST Amount)				
	Per unit cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k- viii	-do-do- for lift from 12m to 13m				
	Details of Cost for : 10.00 Cum	cum	10.00		
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.83		
HC-02	5 HP pump for dewatering	Day	0.80		
LB	LABOUR :				
LB-08	Excavators	Day	5.52		
LB-08	Breakers	Day	5.52		
LB-08	Hole drillers	Day	5.52		
LB-12	Coolie	Day	11.04		
LB-32	Semi Skilled Labour / Beldar	Day	2.76		
	MATERIALS				
MA-BLD- EW-1	Blasting Powder	Kg	6.42		
MA-BLD- EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				

5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k-ix	-do-do- for lift from 13m to 14m				
	Details of Cost for : 10.00 Cum	cum	10.00		
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	0.91		
HC-02	5 HP pump for dewatering	Day	0.90		
LB	LABOUR :				
LB-08	Excavators	Day	6.07		
LB-08	Breakers	Day	6.07		
LB-08	Hole drillers	Day	6.07		
LB-12	Coolie	Day	12.14		
LB-32	Semi Skilled Labour / Beldar	Day	3.04		
	MATERIALS				
MA-BLD-EW-1	Blasting Powder	Kg	6.42		
MA-BLD-EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k-x	-do-do- for lift from 14m to 15m				

	Details of Cost for : 10.00 Cum	cum	10.00		
HC	MACHINERY:				
HC-13	Hire and running charges of tipper	Day	0.125		
HC-20	Pneumatic Breaker with air compressor	Day	1.00		
HC-02	5 HP pump for dewatering	Day	1.00		
LB	LABOUR :				
LB-08	Excavators	Day	6.68		
LB-08	Breakers	Day	6.68		
LB-08	Hole drillers	Day	6.68		
LB-12	Coolie	Day	13.36		
LB-32	Semi Skilled Labour / Beldar	Day	3.34		
	MATERIALS				
MA-BLD-EW-1	Blasting Powder	Kg	6.42		
MA-BLD-EW-2	Fuse	Nos.	7.00		
A	Total Material Cost, Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Material GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Material GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-k-i	for lift from 0.0m to 2.0m	cum			
R2-SE-1-1-k-ii	for lift from 2.0m to 4m	cum			
R2-SE-1-1-k-iii	for lift from 4.0m to 6m	cum			
R2-SE-1-1-k-iv	for lift from 6.0m to 8m	cum			
R2-SE-1-1-k-v	for lift from 8.0m to 10m	cum			
R2-SE-1-1-k-vi	for lift from 10m to 11m	cum			

R2-SE-1-1-k-vii	for lift from 11m to 12m	cum			
R2-SE-1-1-k-viii	for lift from 12m to 13m	cum			
R2-SE-1-1-k-ix	for lift from 13m to 14m	cum			
R2-SE-1-1-k-x	for lift from 14m to 15m	cum			
R2-SE-1-1-k-iii to x	Average rate for 4m to 15m depth	cum	A		
R2-SE-1-1-b to i	Less Average Rate for soil for 4m to 15m depth	cum	B		
R2-SE-1-1-k	Extra over above for item no. SE-1-1 to SE-1-1-i for relevant lift of excavation in hard rock by controlled blasting with necessary safety precautions as per statutory requirement, including drilling, breaking in small pieces, mucking, dressing/ trimming the sides, leveling/ grading of bottoms, etc.	cum	(A-B)		

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u	Extra over above for item no. SE-1-1 to SE-1-1-i for relevant lift of excavation in hard rock and reinforced concrete by chiseling for sewerage works by manual operations, pneumatic breaker, hammer, driller, compressor breaker, etc. including dressing/trimming the sides, leveling of bottoms,				
R2-SE-1-1-u-i	Calculating for total amount for 0m -2m depth	cum	10.00		
	Details for 10 Cum				
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	0.70		
HC-13	Hire and running charges of tipper	Day	0.13		
HC-17	Hire and running charges of loader	Day	0.041		
HC-81	Vibro roller for compaction	Day	0.008		
HC-02	Dewatering Pump of 5HP	Day	0.10		
LB	Labour for Excavation				
LB-08	Excavators	Day	2.00		
LB-08	Breakers	Day	4.00		
LB-10	Chisellers	Day	2.00		
LB-08	Hole Drillers	Day	2.00		
LB-07	Blacksmith 2nd class	Day	0.50		
LB-32	Semi Skilled Labour / Beldar	Day	1.00		
LB-12	Coolie	Day	4.00		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	Supporting Utilities 1% of (A+B)	%			
E	5% Overheads & 10% Contractors Profit on Basic Amount on D	%			
	Total (C+D+E+GST Amount)				
	Per unit cost	Rs/cum			

Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u- ii	-do-do- for lift from 2.0m to4m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	0.77		
HC-13	Hire and running charges of tipper	Day	0.13		
HC-17	Hire and running charges of loader	Day	0.041		
HC-81	Vibro roller for compaction	Day	0.008		
HC-02	Dewatering Pump of 5HP	Day	0.20		
LB	Labour for Excavation				
LB-08	Excavators	Day	2.40		
LB-08	Breakers	Day	4.80		
LB-10	Chisellers	Day	2.40		
LB-08	Hole Drillers	Day	2.40		
LB-07	Blacksmith 2nd class	Day	0.60		
LB-32	Semi Skilled Labour / Beldar	Day	1.20		
LB-12	Coolie	Day	4.80		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			

Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u- iii	-do-do- for lift from 4.0m to6m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	0.85		

HC-13	Hire and running charges of tipper	Day	0.041		
HC-17	Hire and running charges of loader	Day	0.008		
HC-81	Vibro roller for compaction	Day	0.13		
HC-02	Dewatering Pump of 5HP	Day	0.30		
LB	Labour for Excavation				
LB-08	Excavators	Day	2.88		
LB-08	Breakers	Day	5.76		
LB-10	Chisellers	Day	2.88		
LB-08	Hole Drillers	Day	2.88		
LB-07	Blacksmith 2nd class	Day	0.72		
LB-32	Semi Skilled Labour / Beldar	Day	1.44		
LB-12	Coolie	Day	5.76		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u-iv	-do-do- for lift from 6.0m to8m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	0.93		
HC-13	Hire and running charges of tipper	Day	0.041		
HC-17	Hire and running charges of loader	Day	0.008		
HC-81	Vibro roller for compaction	Day	0.13		
HC-02	Dewatering Pump of 5HP	Day	0.40		
LB	Labour for Excavation				
LB-08	Excavators	Day	3.46		
LB-08	Breakers	Day	6.91		
LB-10	Chisellers	Day	3.46		
LB-08	Hole Drillers	Day	3.46		
LB-07	Blacksmith 2nd class	Day	0.86		
LB-32	Semi Skilled Labour / Beldar	Day	1.73		
LB-12	Coolie	Day	6.91		

A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u-v	-do-do- for lift from 8.0m to 10m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	1.02		
HC-13	Hire and running charges of tipper	Day	0.041		
HC-17	Hire and running charges of loader	Day	0.008		
HC-81	Vibro roller for compaction	Day	0.13		
HC-02	Dewatering Pump of 5HP	Day	0.50		
LB	Labour for Excavation				
LB-08	Excavators	Day	4.15		
LB-08	Breakers	Day	8.29		
LB-10	Chisellers	Day	4.15		
LB-08	Hole Drillers	Day	4.15		
LB-07	Blacksmith 2nd class	Day	1.04		
LB-32	Semi Skilled Labour / Beldar	Day	2.07		
LB-12	Coolie	Day	8.29		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				

1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u- vi	-do-do- for lift from 10m to 1m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	1.08		
HC-13	Hire and running charges of tipper	Day	0.041		
HC-17	Hire and running charges of loader	Day	0.008		
HC-81	Vibro roller for compaction	Day	0.13		
HC-02	Dewatering Pump of 5HP	Day	0.60		
LB	Labour for Excavation				
LB-08	Excavators	Day	4.56		
LB-08	Breakers	Day	9.12		
LB-10	Chisellers	Day	4.56		
LB-08	Hole Drillers	Day	4.56		
LB-07	Blacksmith 2nd class	Day	1.14		
LB-32	Semi Skilled Labour / Beldar	Day	2.28		
LB-12	Coolie	Day	9.12		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u- vii	-do-do- for lift from 11m to 12m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	1.13		
HC-13	Hire and running charges of tipper	Day	0.041		

HC-17	Hire and running charges of loader	Day	0.008		
HC-81	Vibro roller for compaction	Day	0.13		
HC-02	Dewatering Pump of 5HP	Day	0.70		
LB	Labour for Excavation				
LB-08	Excavators	Day	5.02		
LB-08	Breakers	Day	10.04		
LB-10	Chisellers	Day	5.02		
LB-08	Hole Drillers	Day	5.02		
LB-07	Blacksmith 2nd class	Day	1.25		
LB-32	Semi Skilled Labour / Beldar	Day	2.51		
LB-12	Coolie	Day	10.04		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u- viii	-do-do- for lift from 12m to13m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	1.19		
HC-13	Hire and running charges of tipper	Day	0.041		
HC-17	Hire and running charges of loader	Day	0.008		
HC-81	Vibro roller for compaction	Day	0.13		
HC-02	Dewatering Pump of 5HP	Day	0.80		
LB	Labour for Excavation				
LB-08	Excavators	Day	5.52		
LB-08	Breakers	Day	11.04		
LB-10	Chisellers	Day	5.52		
LB-08	Hole Drillers	Day	5.52		
LB-07	Blacksmith 2nd class	Day	1.38		
LB-32	Semi Skilled Labour / Beldar	Day	2.76		
LB-12	Coolie	Day	11.04		
A	Total Hire Charge & Labour cost				

	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-u-ix	-do-do- for lift from 13m to14m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	1.25		
HC-13	Hire and running charges of tipper	Day	0.041		
HC-17	Hire and running charges of loader	Day	0.008		
HC-81	Vibro roller for compaction	Day	0.13		
HC-02	Dewatering Pump of 5HP	Day	0.90		
LB	Labour for Excavation				
LB-08	Excavators	Day	6.07		
LB-08	Breakers	Day	12.14		
LB-10	Chisellers	Day	6.07		
LB-08	Hole Drillers	Day	6.07		
LB-07	Blacksmith 2nd class	Day	1.52		
LB-32	Semi Skilled Labour / Beldar	Day	3.04		
LB-12	Coolie	Day	12.14		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				

2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty		
R2-SE-1-1-u-x	-do-do- for lift from 14m to 15m	cum	10.00		
HC	Hire Charges				
HC-20	Pneumatic Breaker with air compressor	Day	1.31		
HC-13	Hire and running charges of tipper	Day	0.041		
HC-17	Hire and running charges of loader	Day	0.008		
HC-81	Vibro roller for compaction	Day	0.13		
HC-02	Dewatering Pump of 5HP	Day	1.00		
LB	Labour for Excavation				
LB-08	Excavators	Day	6.68		
LB-08	Breakers	Day	13.36		
LB-10	Chisellers	Day	6.68		
LB-08	Hole Drillers	Day	6.68		
LB-07	Blacksmith 2nd class	Day	1.67		
LB-32	Semi Skilled Labour / Beldar	Day	3.34		
LB-12	Coolie	Day	13.36		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount including GST
R2-SE-1-1-u-i	for lift from 0.0m to 2.0m	Rs/cum			
R2-SE-1-1-u-ii	for lift from 2.0m to 4m	Rs/cum			
R2-SE-1-1-u-iii	for lift from 4.0m to 6m	Rs/cum			
R2-SE-1-1-u-iv	for lift from 6.0m to 8m	Rs/cum			
R2-SE-1-1-u-v	for lift from 8.0m to 10m	Rs/cum			

R2-SE-1-1-u-vi	for lift from 10m to 11m	Rs/cum			
R2-SE-1-1-u-vii	for lift from 11m to 12m	Rs/cum			
R2-SE-1-1-u-viii	for lift from 12m to 13m	Rs/cum			
R2-SE-1-1-u-ix	for lift from 13m to 14m	Rs/cum			
R2-SE-1-1-u-x	for lift from 14m to 15m	Rs/cum			
R2-SE-1-1-u-iii to x	Average rate for 4m to 15m depth	Rs/cum	A		
R2-SE-1-1-b to i	Less Average Rate for soil for 4m to 15m depth	Rs/cum	B		
R2-SE-1-1-u	Extra over above for item no. SE-1-1 to SE-1-1-i for relevant lift of excavation in hard rock and reinforced concrete by chiseling for sewerage works by manual operations, pneumatic breaker, hammer, driller, compressor breaker, etc. including dressing/trimming the sides, leveling of bottoms,	Rs/cum	(A-B)		
Code No	Description	Unit/pe er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-1-ae	Extra over above for item no. SE-1-1 to SE-1-1-i for relevant lifts of excavation in hard rock and reinforced concrete by splitter machine	cum	10.00		
HC	Hire Charges				
HC-18	Rock Splitter and allied equipments	Day	10.00		
HC-13	Hire and running charges of tipper	Day	0.00		
HC-20	Pneumatic breaker	Day	1.00		
LB	Labour for Excavation				
LB-16	Splitter operator	Day	1.00		
LB-12	Labour	Day	0.00		
LB-08	Hole Drillers	Day	2.00		
LB-33	Mistry	Day	1.00		
A	Total Hire Charge & Labour cost				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Tools & Plants 2% on A	%			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (C+D+GST Amount)				
	Per unit cost	Rs/cum	A		
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

R2-SE-1-1-u	Add rate of Extra over above for item no. SE-1-1 to SE-1-1-i for relevant lift of excavation in hard rock and reinforced concrete by chiseling for sewerage works by manual operations, pneumatic breaker, hammer, driller, compressor breaker, etc. including dressing/trimming the sides, leveling of bottoms, etc.	Rs/cum	B		
R2-SE-1-1-ae	Extra over above for item no. SE-1-1 to SE-1-1-i for relevant lifts of excavation in hard rock and reinforced concrete by splitter machine	Rs/cum	(A+B)		

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-2	Providing watching fencing etc. to trench excavation per running meter length of trench as per drawing and as directed by Engineer.	Rmt	30.00		
	Details of Cost for : 30m				
	Wood and sheet used for 10 times				
MA	Material Charges				
MA-BLD-SS-25	Wooden ballies(used 10 times)	no	26		
MA-BLD-EW-3	Wooden Planks	sqm	20		
LB-32	Labour Charges				
LB-32	Semi Skilled Labour / Beldars	Day	4		
A	Total Material and Labour				
	Total Basic Amount				
	Material GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	Painting @10%	LS			
C	Total (A+B)				
D	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total (A+B)				
	Per unit cost	m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-3	Transporting surplus materials upto 3 Km. including levelling.				
	Details of Cost for : 5 Cum	cum	5.00		
	Hire Charges				
	Avg. Speed of tipper(Avg. 5 Cum cap) considered	Km/Hr	20		
	Time (To & fro) required to a tipper for 3 km transportation	Hr	0.3		
	Add time for loading, unloading	Hr	0.7		
HC-13	i.e. Tipper required considering 8 Hr. day	Day	0.125		

	LABOUR :				
LB-12	Mate/ Female coolie	Day	0.2		
LB-32	Semi Skilled Labour / Beldar	Day	0.2		
A	Total Machinery and Labour				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on A	%			
	Total (A+B)				
	Considering 30% extra for voids				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty	Rate including GST	Amount includin g GST
R2-SE-1-3-2	E.O. above for transporting beyond 3 km. for every 1 km.				
	Details of Cost for : 5 Cum	cum	5.00		
	Hire Charges				
	Avg. Speed of tipper(Avg. 5 Cum cap) considered	Km/Hr	20.00		
	Time (To & fro) required to a tipper for 1km transportation	Hr	0.1		
	Add 10% extra time for day travelling	Hr	0.120		
HC-13	i.e. Tipper required considering 8 Hr. day	Day	0.015		
A	Total Machinery and Labour				
	Total Basic Amount				
	Machinery Hire GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on A	%			
	Total (A+B)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Total GST Amount				
4	Contractors Profit				
5	Total per unit Amount				

Code No	Description	Unit/p er	Qty		
---------	-------------	--------------	-----	--	--

R2-SE-1-3-1	Transporting surplus materials upto 3 Km. excluding levelling.				
	Details of Cost for : 5 Cum	cum	5.00		
	Hire Charges				
	Avg. Speed of tipper(Avg. 5 Cum cap) considered	Km/Hr	20		
	Time (To & fro) required to a tipper for 3 km transportation	Hr(1/8th day)	0.3		
	Total time for Tipper & loading, unloading	Hr	0.7		
HC-13	i.e. Tipper required considering 8 Hr. day	Day	0.125		
	LABOUR :				
LB-12	Mate/ Female coolie	Day	0.1		
LB-32	Semi Skilled Labour / Beldar	Day	0.1		
A	Total				
	Total Basic Amount				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on A	%			
	Total (A+B)				
	Considering 30% extra for voids				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty		
R2-SE-1-4	Providing and removing of close shoring and strutting in the trenches/ pits for all depths as per specifications/ drawings and or as directed by Engineer-in-charge by including walling, struts, open poling boards, horizontal sheeting, runners, dog spikes by using timber etc. complete.	sqm	120.00		
	Details of Cost for : 120.00 Sq.m of supported area and				
	Avg Depth-6m				
	Material :				
MA-BLD-EW-3	Poling boards	Cum	6.50		
MA-BLD-EW-3	Waling	Cum	3.00		
MA-BLD-EW-3	Struts	Cum	1.08		
	Assuming that the above materials can be used 4 times on the same work & also considering the salvage value as 5%				
	i.e. deduct 5% from total material cost				
	Cost of material=25%				
	Add for nails etc. @1.5%				

	LABOUR :				
LB-32	Semi Skilled Labour / Beldar	Day	12.00		
LB-10	Carpentar 2nd class	Day	6.00		
A	Total Labour & Materials				
	Total Basic Amount				
	Material GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on A	%			
	Total (A+B)				
	Per unit cost	Rs/sqm			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

SE 1-4-a	Providing and removing of close shoring and strutting in the trenches/ pits for all depths as per specifications/ drawings and or as directed by Engineer-in-charge by including walling, struts, open poling boards, horizontal sheeting, runners, dog spikes by using timber etc. complete.	m	10.00		
	Details of Cost for :10 m length and				
	Avg Depth-6m				
	Material :				
MA-BLD-EW-3	Poling boards	Cum	6.50		
MA-BLD-EW-3	Waling	Cum	3.00		
MA-BLD-EW-3	Struts	Cum	1.08		
	Assuming that the above materials can be used 4 times on the same work & also considering the salvage value as 5%				
	i.e. deduct 5% from total material cost				
	Cost of material=25%				
	Add for nails etc. @1.5%				
	LABOUR :				
LB-32	Semi Skilled Labour / Beldar	Day	12.00		
LB-10	Carpentar 2nd class	Day	6.00		
A	Total Labour & Materials				
	Total Basic Amount				
	Material GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				

B	5% Overheads & 10% Contractors Profit on Basic Amount on A	%			
	Total (A+B)				
	Per unit cost	Rs/Cu m			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

	Providing and removing open shoring and strutting in the trenches/ pits for all depths as per specifications/ drawings and or as directed by Engineer-in-charge by including walling, struts, open poling boards, horizontal sheeting, runners, dog spikes by using timber etc. complete.	cum	9.04		
	Details of Cost for : 9.04 Cum				
	Avg Depth-6m				
	Material :				
MA-BLD- EW-3	Sheathing	Cum	1.30		
MA-BLD- EW-3	Waling	Cum	2.40		
MA-BLD- EW-3	Struts	Cum	0.54		
	Assuming that the above materials can be used 4 times on the same work & also considering the salvage value as 25%				
	i.e. deduct 25% from total material cost				
	Cost of material=20%				
	Add for nails etc. @1.5%				
	LABOUR :				
LB-32	Semi Skilled Labour / Beldar	Day	12.00		
LB-07	Carpentar 2nd class	Day	6.00		
A	Total Labour & Materials				
	Total Basic Amount				
	Material GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on A	%			
	Total (A+B)				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				

6 Total per unit Amount					
Code No	Description	Unit/p er	Qty		
R2-SE-1-5	Leaving shoring in trenches. (New or old) including dog spikes.	Sqm	120.00		
	Details of Cost for : 120 Sq.m of trench				
	Average Depth-8m				
	MATERIAL :				
MA-BLD- EW-3	Sheathing	Cum	6.50		
MA-BLD- EW-3	Waling	Cum	3.00		
MA-BLD- EW-3	Struts	Cum	1.08		
	Assuming that half of the above materials will be left in trench 50% will be taken as the cost of wood to be left Add for nails etc. @1.5%				
	Total Material				
	LABOUR :				
LB-32	Semi Skilled Labour / Beldar	Day	6.00		
LB-10	Carpentar 2nd class	Day	6.00		
A	Total Labour & Materials				
	Total Basic Amount				
	Material GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total A+B				
	Per unit cost	Rs/sqm			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

Code No	Description	Unit/p er	Qty		
R2-SE-1-5-a	Leaving shoring in trenches. (New or old) including dog spikes.	Cum	10.58		
	Details of Cost for : 120 Sq.m of trench				
	Average Depth-8m				
	MATERIAL :				
MA-BLD- EW-3	Poling boards	Cum	6.50		
MA-BLD- EW-3	Walling	Cum	3.00		
MA-BLD- EW-3	Struts	Cum	1.08		
	Assuming that half of the above materials will be left in trench				

	50% will be taken as the cost of wood to be left				
	Add for nails etc. @1.5%				
	Total Material				
	LABOUR :				
LB-32	Semi Skilled Labour / Beldar	Day	6		
LB-10	Carpentar 2nd class	Day	6		
A	Total Labour & Materials				
	Total Basic Amount				
	Material GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total A+B				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

R2-SE-1-5b	Providing and leaving of close shoring and strutting in the trenches/ pits for all depths in running sand as per specifications/ drawings and or as directed by Engineer-in-charge by including walling, struts, open poling boards, horizontal sheeting, runners, dog spikes by using timber (New or old) etc. complete. [Note: sanction of director/DMC (SE)/DMC(E) should be obtained for including the item in BOQ during the approval of Draft Tender]	Sqm	120.00		
	Details of Cost for : 120 Sq.m of trench				
	Average Depth-8m				
	MATERIAL :				
MA-BLD-EW-3	Sheathing	Cum	6.50		
MA-BLD-EW-3	Waling	Cum	3.00		
MA-BLD-EW-3	Struts	Cum	1.08		
	Assuming that all of the above materials used is old and will be left in trench				
	35% will be taken as the cost of wood to be left				
	Add for nails etc. @1.5%				
	Total Material				
	LABOUR :				
LB-32	Semi Skilled Labour / Beldar	Day	6.00		
LB-10	Carpentar 2nd class	Day	6.00		
A	Total Labour & Materials				
	Total Basic Amount				
	Material GST				
	Labour GST				

	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total A+B				
	Per unit cost	Rs/sqm			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				
3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				

R2-SE-1-5-c	Providing and leaving of close shoring and strutting in the trenches/ pits for all depths in running sand as per specifications/ drawings and or as directed by Engineer-in-charge by including walling, struts, open poling boards, horizontal sheeting, runners, dog spikes by using timber (New or old) etc. complete. [Note: sanction of director/DMC (SE)/DMC(E) should be obtained for including the item in BOQ during the approval of Draft Tender]	Cum	10.58		
	Details of Cost for : 120 Sq.m of trench				
	Average Depth-8m				
	MATERIAL :				
MA-BLD-EW-3	Poling boards	Cum	6.50		
MA-BLD-EW-3	Walling	Cum	3.00		
MA-BLD-EW-3	Struts	Cum	1.08		
	Assuming that all of the above materials used is old and will be left in trench				
	35% will be taken as the cost of wood to be left				
	Add for nails etc. @1.5%				
	Total Material				
	LABOUR :				
LB-32	Semi Skilled Labour / Beldar	Day	6		
LB-10	Carpentar 2nd class	Day	6		
A	Total Labour & Materials				
	Total Basic Amount				
	Material GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on C	%			
	Total A+B				
	Per unit cost	Rs/cum			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Machinery Hire GST				

3	Labour GST				
4	Total GST Amount				
5	Contractors Profit				
6	Total per unit Amount				
Code No	Description	Unit/p er	Qty		
R2-SE-1-6	Providing and fixing M.S plate shoring in trench consisting of 12mm thick M.S sheet, 1.5m wide MS channel 150x75mm,at 1.5m center to centre including removal after laying sewer Details of Cost for : 85 Sq.m.	Sqm	85.00		
	MATERIAL :				
MA-GN-23	MS Chequered Plate (12mm thick)	MT	9.00		
MA-GN-23	1.5 wide MS channels	MT	3.00		
	Considering the salvage value as 33% and 10 times reuse i.e. deduct 33% from total material cost and divide for 10 times				
MA-HE-01-h	Oxygen cylinder	Nos	10.00		
	Gas Cylinder	Nos	3.00		
MA-HE-01-c	Welding rod	Nos	360.00		
HC	Hire Charges				
HC-23	Diesel Welding machine with generator, including Fuel, Transport, operator, etc	Day	20.00		
MA-HE-01-i	Gas Cutter	Day	20.00		
HC-60	Hydra Crane	Day	15.00		
LB	LABOUR :				
LB-12	Labour	Day	30.00		
LB-32	Labour (Semi-Skilled)	Day	40.00		
LB-02	Welder	Day	30.00		
LB-16	Gas cutter	Day	20.00		
A	Total Labour, Hire & Materials				
	Total Basic Amount				
	Material GST				
	Machinery Hire GST				
	Labour GST				
	Total GST Amount				
	Amount including GST				
B	5% Overheads & 10% Contractors Profit on Basic Amount on A	%			
	Total				
	Per unit cost	Rs/sqm			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Machinery Hire GST				
4	Labour GST				
5	Total GST Amount				
6	Contractors Profit				
7	Total per unit Amount				

Code No	Description	Unit	Qty		
R2-SE-5-9-a	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-160mm dia	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-a	(i) 160 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	0.182		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	0.5		
LB-32	Labour	Day	3		
	Hire Charges				
HC 51+HC49	Jointing machine(Mirror)	Day	0.5		
HC-50	Machanical jack for holding pipe	Day	0.5		
A	Total				
B	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-b	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-200mm dia	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-b	(i) 200 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	0.248		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	0.5		
LB-32	Labour	Day	4		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.5		
HC-50	Machanical jack for holding pipe	Day	0.5		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				

	Per Unit Cost	Rs/RM		
Sr. no.	Per Unit Amount			
1	Total Basic Amount			
2	Material GST			
3	Carriage GST			
4	Labour GST			
5	Hie GST			
6	Total GST Amount			
7	Contractors Profit			
8	Total per unit Amount			
Code No	Description	Unit	Qty	
R2-SE-5-9-c	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-250mm dia	RM	30	
	Details of Cost for 30 M			
MA	Material			
MA-SP-08-c	(i) 250 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25	
CR	Carriage Charges			
CA-SP-1	Carriage of pipes(HDPE)	Tonne	0.391	
	Note : Rate for Initial Lead of 100 m is considered			
LB	Labour			
LB-16	Fitter	Day	0.75	
LB-32	Labour	Day	4	
B	Hire Charges			
HC 51+HC49	Jointing machine	Day	0.5	
HC-50	Machanical jack for holding pipe	Day	0.5	
	Total			
C	5% Overheads & 10% Contractors Profit on Basic Amount			
D	Total Cost (A+B+C)			
	Per Unit Cost	Rs/RM		
Sr. no.	Per Unit Amount			
1	Total Basic Amount			
2	Material GST			
3	Carriage GST			
4	Labour GST			
5	Hie GST			
6	Total GST Amount			
7	Contractors Profit			
8	Total per unit Amount			
Code No	Description	Unit	Qty	
R2-SE-5-9-d	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-280mm dia	RM	30	
	Details of Cost for 30 M			
MA	Material			
MA-SP-08-c-1	(i) 280 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25	

CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	0.52		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	0.75		
LB-32	Labour	Day	4		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.5		
HC-50	Machanical jack for holding pipe	Day	0.5		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-e	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-315 mm dia	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-d	(i) 315 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	0.647		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	0.75		
LB-32	Labour	Day	4		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.65		
HC-50	Machanical jack for holding pipe	Day	0.65		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				

4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-f	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-355 mm dia	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-e	(i) 355 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	0.79		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	1		
LB-32	Labour	Day	5		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.65		
HC-50	Machanical jack for holding pipe	Day	0.65		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-g	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-400mm dia	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-f	(i) 400 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	1.05		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	1		
LB-32	Labour	Day	5		

B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.75		
HC-50	Machanical jack for holding pipe	Day	0.75		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-h	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-450 mm dia	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-g	(i) 450mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	1.329		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	1.25		
LB-32	Labour	Day	5.5		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.75		
HC-50	Machanical jack for holding pipe	Day	0.75		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-i	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6	RM	30		

	class with butt joints etc.complete as specified and directed-500mm dia				
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-h	(i) 500 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	1.64		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	1.5		
LB-32	Labour	Day	5.5		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.8		
HC-50	Machanical jack for holding pipe	Day	0.8		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-j	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-560mm dia	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-i	(i) 560 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	2.067		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	1.75		
LB-32	Labour	Day	6		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.8		
HC-50	Machanical jack for holding pipe	Day	0.8		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				

	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-k	Providing Laying and Jointing HDPE pipes of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-630mm dia	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-j	(i) 630 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	2.58		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	2		
LB-32	Labour	Day	7		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.9		
HC-50	Machanical jack for holding pipe	Day	0.9		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-l	710 mm dia (OD) -do-do- but of PE-100 and PN6 class	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-k	(i) 710 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	3.58		

	Note : Rate for Initial Lead of 100 m is considered			
LB	Labour			
LB-16	Fitter	Day	2	
LB-32	Labour	Day	7	
B	Hire Charges			
HC 51+HC49	Jointing machine	Day	1	
HC-50	Machanical jack for holding pipe	Day	1	
	Total			
C	5% Overheads & 10% Contractors Profit on Basic Amount			
D	Total Cost (A+B+C)			
	Per Unit Cost	Rs/RM		
Sr. no.	Per Unit Amount			
1	Total Basic Amount			
2	Material GST			
3	Carriage GST			
4	Labour GST			
5	Hie GST			
6	Total GST Amount			
7	Contractors Profit			
8	Total per unit Amount			
Code No	Description	Unit	Qty	
R2-SE-5-9-m	800 mm dia (OD)-do-do- but of PE-100 and PN6 class	RM	30	
	Details of Cost for 30 M			
MA	Material			
MA-SP-08-1	(i) 800 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25	
CR	Carriage Charges			
CA-SP-1	Carriage of pipes(HDPE)	Tonne	3.96	
	Note : Rate for Initial Lead of 100 m is considered			
LB	Labour			
LB-16	Fitter	Day	2.25	
LB-32	Labour	Day	8	
B	Hire Charges			
HC 51+HC49	Jointing machine	Day	1.5	
HC-50	Machanical jack for holding pipe	Day	1.5	
	Total			
C	5% Overheads & 10% Contractors Profit on Basic Amount			
D	Total Cost (A+B+C)			
	Per Unit Cost	Rs/RM		
Sr. no.	Per Unit Amount			
1	Total Basic Amount			
2	Material GST			
3	Carriage GST			
4	Labour GST			
5	Hie GST			
6	Total GST Amount			
7	Contractors Profit			
8	Total per unit Amount			

Code No	Description	Unit	Qty		
R2-SE-5-9-n	900 mm dia (OD)-do-do- but of PE-100 and PN6 class	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-m	(i) 900 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	5.18		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	2.5		
LB-32	Labour	Day	9		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	1.5		
HC-50	Machanical jack for holding pipe	Day	1.5		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-9-o	1000 mm dia (OD)-do-do- but of PE-100 and PN6 class	RM	30		
	Details of Cost for 30 M				
MA	Material				
MA-SP-08-n	(i) 1000 mm HDPE PN-6 class pipes(PN-80 grade) 6 m long (add 5% wastage)	Each	5.25		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	6.5		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	3		
LB-32	Labour	Day	10		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	1.75		
HC-50	Machanical jack for holding pipe	Day	1.75		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Rs/RM			

Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-a	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-160mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-a	(i) 160 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	0.455		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	1.5		
LB-32	Labour	Day	4		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.5		
HC-50	Machanical jack for holding pipe	Day	0.5		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-b	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-200 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-b	(i) 200 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	0.62		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				

LB-16	Fitter	Day	1.5		
LB-32	Labour	Day	4		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.5		
HC-50	Machanical jack for holding pipe	Day	0.5		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-c	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-250 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-c	(i) 250 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	0.9775		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	1.75		
LB-32	Labour	Day	6		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.5		
HC-50	Machanical jack for holding pipe	Day	0.5		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				

Code No	Description	Unit	Qty		
R2-SE-5-10-d	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-280 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-ci	(i) 280 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	1.3		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	2		
LB-32	Labour	Day	7		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.5		
HC-50	Machanical jack for holding pipe	Day	0.5		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-e	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-315 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-d	(i) 315 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	1.6175		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	2.25		
LB-32	Labour	Day	8		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.5		
HC-50	Machanical jack for holding pipe	Day	0.5		
	Total				

C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-f	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-355 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-e	(i) 355 mm HDPE PN-6 class pipes(PN-80 grade) bends(add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	1.975		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	2.35		
LB-32	Labour	Day	9		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.65		
HC-50	Machanical jack for holding pipe	Day	0.65		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-g	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-400 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-f	(i) 400 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		

CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	2.625		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	2.5		
LB-32	Labour	Day	10		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.65		
HC-50	Machanical jack for holding pipe	Day	0.65		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-h	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-450 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-g	(i) 450mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	3.3225		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	2.75		
LB-32	Labour	Day	10		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.7		
HC-50	Machanical jack for holding pipe	Day	0.7		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				

5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-i	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-500 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-h	(i) 500 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	4.1		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	3		
LB-32	Labour	Day	11		
B	Hire Charges				
HC 51+HC49	Jointing machine	Day	0.7		
HC-50	Machanical jack for holding pipe	Day	0.7		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-j	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-560 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-i	(i) 560 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of bends (HDPE)	Tonne	5.1675		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	3.25		
LB-32	Labour	Day	12		
B	Hire Charges				

HC 51+HC49	Jointing machine	Day	0.8		
HC-50	Machanical jack for holding pipe	Day	0.8		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				
Code No	Description	Unit	Qty		
R2-SE-5-10-k	Providing Laying and Jointing HDPE Bends/Tees of PE-80 grade and PN-6 class with butt joints etc.complete as specified and directed-630 mm dia	Each	100		
	Details of Cost for 100 bends				
MA	Material				
MA-SP-09-j	(i) 630 mm HDPE PN-6 class pipes(PN-80 grade) bends (add 5% wastage)	Each	105		
CR	Carriage Charges				
CA-SP-1	Carriage of pipes(HDPE)	Tonne	6.45		
	Note : Rate for Initial Lead of 100 m is considered				
LB	Labour				
LB-16	Fitter	Day	3.5		
LB-32	Labour	Day	12		
B	Hire Charges				
	Jointing machine	Day	0.9		
HC-50	Machanical jack for holding pipe	Day	0.9		
	Total				
C	5% Overheads & 10% Contractors Profit on Basic Amount				
D	Total Cost (A+B+C)				
	Per Unit Cost	Each			
Sr. no.	Per Unit Amount				
1	Total Basic Amount				
2	Material GST				
3	Carriage GST				
4	Labour GST				
5	Hie GST				
6	Total GST Amount				
7	Contractors Profit				
8	Total per unit Amount				

R2-SE-6-1	Constructing on sewer brick masonry conical Roboholes 1.2M dia. at bottom 0.56 M. dia. at top, built in brick masonry in cement mortar 1:3, plastered both inside and outside with 20 mm thick cement mortar 1:2 and neat cement rendering so as to give a smooth surface, including 300 mm thick M.15 cement concrete in foundation and in haunches and channels finished smooth with 20mm thick cement plaster in cement mortar 1:1 and providing C.I. steps (weighing 5,4 kg each) staggered at 300 mm. c/c including 75mm wide vata all round the external portion of the Robohole and the foundation concrete in cement mortar 1:1 and supporting the incoming pipes with brick masonry wherever necessary including C.I. heavy air-tight frame & cover (minimum 230 Kg.) resting on 30 cm high cement concrete M.20 cap with necessary centering etc. all complete as per standard specifications and directions including finishing the cap with cement plaster on both sides 1:2 and neat cement rendering so as to give a smooth surface in line and level with the brick masonry surface and as per drawing in DyCh.E.(Sewerage)P&D's office without excavation depth upto 1.5 M.(Depth of Robohole measured from top of Robohole cover to Invert level of Robohole)				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	1.24848		
ii)	CC Cap (M20)(SE-2-9)	cum	0.2653297		
iii)	Haunch concrete (M15)(SE-2-6)	cum	0.33		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	0.8803922		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	10.696912		
vi)	C.I steps (MA-SP-23)	each	4		
vii)	CI frame & cover 0.56m dia (wt-230 Kg)(MA-SP-13-a)	No	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1.52		
ix)	Vata (1:1)(SE-4-8)	cum	0.0392699		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	1.85		
	Per unit Cost	No			
R2-SE-6-1-a	Extra over above per metre depth above 1.5 M. and upto 2.3 M. depth -do- -do-				
	Depth: 2.3-1.5=0.8				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	0.849738		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	7.187964		
c	CI steps (5.4 kg)(MA-SP-23)	each	2.6666667		
d)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	0.8		
	Per Unit Cost	m.dept h			
	Percentages are not added as they are added in each finished item earlier				
Code No	Description	Unit	Qty		
R2-SE-6-2-a	Constructing on sewer brick masonry conical Robohole 1.5 M. dia. at bottom and 0.56 M dia. at top including C.I. Heavy circular air tight frame and cover etc. complete as per description in item No.SE-6-1 depth upto 2.3 M.				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	2.352		
ii)	CC Cap (M20)(SE-2-9)	cum	0.4058003		
iii)	Haunch concrete (M15)(SE-2-6)	cum	0.81		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	1.7378076		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	18.584962		
vi)	C.I steps (MA-SP-23)	each	6		
vii)	CI frame & cover 0.56m dia (wt-230 Kg)(MA-SP-13-a)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.28		
ix)	Vata (1:1)(SE-4-8)	cum	0.0392699		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	3.12		
	Per unit Cost	No			
R2-SE-6-2-b	Extra over above per metre depth above 2.3 M. and upto 5 M. depth -do- -do-				
	Depth: 5-2.3=2.7				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	5.6110416		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	31.384511		

c	CI steps (5.4 kg)(MA-SP-23)	each	9		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.22		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.7		
f)	Safety Chain	No	1		
	Overhead @ 5%		0.05		
	Per Unit Cost	m.dept h			
R2-SE-6-2-c	Do- -do- above 5 M & upto 9 M -do- -do-				
	Depth: 4 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	11.561061		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	49.260173		
c	CI steps (5.4 kg)(MA-SP-23)	each	13.333333		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.34		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4		
	Overheads@15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-2-d	Do- -do- above 9.M & upto 11 M -do- -do-				
	Depth: 2 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	8.0676099		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	26.389378		
c	CI steps (5.4 kg)(MA-SP-23)	each	6.6666667		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.46		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overheads@20%		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-2-e	Do- -do- above 11M & upto 12 M -do- -do-				
	Depth: 1m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	5.3956854		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	14.137167		
c	CI steps (5.4 kg)(MA-SP-23)	each	3.3333333		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.53		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1		
	Overhead @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-2-f	Do- -do- above 12 M and upto 14 M depth -do- -do-				
	Depth: 2				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	13.797875		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	30.661944		
c	CI steps (5.4 kg)(MA-SP-23)	each	6.6666667		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.62		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overheads @ 35%		0.35		
	Per Unit Cost	m.dept h			

Code No	Description	Unit	Qty		
R2-SE-6-3	Constructing on sewer brick masonry conical Robohole 1.8M dia. at bottom 0.56M dia at top, including C.I. Heavy circular airtight frame and cover etc. complete as per description in Item No.SE-6-1 depth upto 2.9 M				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	2.41968		
ii)	CC Cap (M20)(SE-2-9)	cum	0.4202646		
iii)	Haunch concrete (M15)(SE-2-6)	cum	1.01		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	3.4326636		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	27.488323		
vi)	C.I steps (MA-SP-23)	each	8		
vii)	CI frame & cover 0.56m dia (wt-230 Kg)(MA-SP-13-a)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.9		
ix)	Vata (1:1)(SE-4-8)	cum	0.05		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	4.7		
	Per unit Cost	No			
R2-SE-6-3-a	Extra over above per metre depth above 2.9 M. and upto 5 M. depth -do- -do- Depth: 5-2.9=2.1				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	5.0568646		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	28.368582		
c	CI steps (5.4 kg)(MA-SP-23)	each	7		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.26		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.1		
f)	Safety Chain	No	1		
	Overhead @ 5%		0.05		
	Per Unit Cost	m.dept h			
R2-SE-6-3-b	Do- -do- above 5 M & upto 9 M -do- -do- Depth: 4 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	13.29522		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	56.799995		
c	CI steps (5.4 kg)(MA-SP-23)	each	13		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.34		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4		
	Overheads@15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-3-c	Do- -do- above 9.M & upto 11 M -do- -do- Depth: 2 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	9.1985833		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	30.159289		
c	CI steps (5.4 kg)(MA-SP-23)	each	7		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.59		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overheads @ 20%		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-3-d	Do- -do- above 11M & upto 12 M -do- -do- Depth: 1m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	6.1025437		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	16.022123		

c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.66		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1		
	Overheads @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-3-e	Do- -do- above 12 M and upto 14 M depth -do- -do- Depth: 2				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	15.494335		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	34.431855		
c	CI steps (5.4 kg)(MA-SP-23)	each	7		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.7		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overheads @ 35%		0.35		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-4	Constructing on sewer brick masonry trapezoidal Robohole 1.5M x 0.9M at bottom and 0.9M x 0.45M at top, including C.I. EHD airtight rectangular frame and cover weighing minimum 225 kg . complete as per description in Item No.SE-6-1 depth upto 1.2M				
i)	Bed Concrete(M15)(SE-2-4)	cum	1.22148		
ii)	CC Cap (M20)(SE-2-9)	cum	0.5557774		
iii)	Haunch concrete (M15)(SE-2-6)	cum	0.42525		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	0.8958231		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	11.494949		
vi)	C.I steps (MA-SP-23)	each	3		
vii)	CI frame & cover (MA SP-13-b)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1.2		
ix)	Vata (1:1)(SE-4-8)	cum	0.04		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	2.16		
	Per unit Cost	No			
R2-SE-6-4-a	Extra over above per metre depth above 1.2 M. and upto 2.3 M. depth -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	1.44716		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	8.932		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1.1		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-5	Constructing on sewer brick masonry trapezoidal Robohole 1.5M x 1.2M at bottom and 0.9M x 0.6M at top, including C.I. EHD airtight rectangular frame and cover weighing minimum 270 kg . complete as per description in Item No.SE-6-1 depth upto 1.2M				
i)	Bed Concrete(M15)(SE-2-4)	cum	1.43208		
ii)	CC Cap (M20)(SE-2-9)	cum	0.5995435		

iii)	Haunch concrete (M15)(SE-2-6)	cum	0.432		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	0.9903957		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	12.66618		
vi)	C.I steps (MA-SP-23)	each	3		
vii)	CI frame & cover (MA-SP-13-c)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1.2		
ix)	Vata (1:1)(SE-4-8)	cum	0.041		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	2.52		
	Per unit Cost	No			
R2-SE-6-5-a	Extra over above per metre depth above 1.2 M. and upto 2.3 M. depth -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	1.59896		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	9.922		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1.1		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-6	Constructing on sewer brick masonry trapezoidal Robohole 1.8M x 1.5 M at bottom and 0.9 M x 0.6M at top, including C.I. EHD airtight rectangular frame and cover weighing minimum 270 kg . complete as per description in Item No.SE-6-1 depth 2.9 M				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	2.22912		
ii)	CC Cap (M20)(SE-2-9)	cum	0.6007645		
iii)	Haunch concrete (M15)(SE-2-6)	cum	1.08		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	4.0438607		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	34.155931		
vi)	C.I steps (MA-SP-23)	each	8		
vii)	CI frame & cover (MA-SP-13-c)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	3.48		
ix)	Vata (1:1)(SE-4-8)	cum	0.0672		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	4.5		
	Per unit Cost	No			
R2-SE-6-6-a	Extra over above per metre depth above 2.9 M. and upto 5 M. depth -do- -do-				
	Depth: 5-2.9=2.1				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	5.88		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	33.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.52		
f)	Safety Chain	No	1		
	Overhead @ 5%		0.05		
	Per Unit Cost	m.dept h			
R2-SE-6-6-b	Do- -do- above 5 M & upto 9 M -do- -do-				
	Depth: 4 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	15.5296		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	67.52		
c	CI steps (5.4 kg)(MA-SP-23)	each	13		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.37488		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.8		
	Overheads@15%		0.15		

	Per Unit Cost	m.dept h			
R2-SE-6-6-c	Do- -do- above 9.M & upto 11 M -do- -do- Depth: 2 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	10.8		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	36		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.51912		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.4		
	Overhead @20%		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-6-d	Do- -do- above 11M & upto 12 M -do- -do- Depth: 1m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	7.2		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	19.2		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6084		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1.2		
	Overhead @25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-6-e	Do- -do- above 12 M and upto 14 M depth -do- -do- Depth: 2				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	18.36		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	40.8		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6624		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @35%		0.35		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-7	Constructing brick masonry trapezoidal Robohole on sewer 2.4M x 1.5M at bottom and 0.9M x 0.6M at top built in brick masonry in C.M. 1:3 plastered both inside and outside with 20 mm thick cement plaster in C.M. 1:2 and neat cement rendering so as to give a smooth surface 300 mm thick M 15 cement concrete in foundation and in haunches and channels finished smooth with 20 mm cement plaster in C.M. 1:1 and providing C.I. steps (approximately weighing 4.5 kg each)staggered at 300mm c/c. including 75 mm wide vata all round the external portion of the Robohole and the foundation concrete in cement mortar 1:1 and supporting the incoming pipes with brick masonry wherever necessary including 0.9m x 0.6M C.I. heavy airtight rectangular frame and cover weighing minimum 260 Kg resting on 300mm high cement concrete M15 cap with necessary centering including cement plaster (1:2) on both sides neat cement rendering so as to give a smooth surface in line and level including safety chain and extra C.I steps on other side benching complete as per standard specifications & directions and as per drawing in Dy.Ch.E. (SP) P&D's office without excavation depth upto 4.5M				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	2.69352		
ii)	CC Cap (M20)(SE-2-9)	cum	0.6209241		

iii)	Haunch concrete (M15)(SE-2-6)	cum	2.025		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	9.7251015		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	67.580124		
vi)	C.I steps (MA-SP-23)	each	14		
vii)	CI frame & cover (MA-SP-13-c)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.5		
ix)	Vata (1:1)(SE-4-8)	cum	0.0672		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	6.3		
xi)	Overheads@5%		0.05		
xii)	Safety Chain	No	1		
	Per unit Cost	No			
R2-SE-6-7-a	Extra over above per metre depth above 4.5 M. and upto 9 M. depth -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	19.9548		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	86.76		
c	CI steps (5.4 kg)(MA-SP-23)	each	14		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.41448		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.5		
	Overheads@15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-7-b	Do- -do- above 9M & upto 11 M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	12.24		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	40.8		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.56952		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overheads @ 20%		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-7-c	Do- -do- above 11.M & upto 12M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	8.1		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	21.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6624		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overheads @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-7-d	Do- -do- above 12M & upto 14M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	20.52		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	45.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.7164		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overheads @ 35%		0.35		
	Per Unit Cost	m.dept h			

Code No	Description	Unit	Qty		
R2-SE-6-8	Constructing on sewer brick masonry scraper Robohole 1.5M x 1.5 M at bottom and 1.2 M x 0.9M at top, including C.I. Heavy airtight rectangular frame and cover weighing minimum 900 kg . complete as per description in Item No.SE-6-1 depth 2.9 M				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	1.99692		
ii)	CC Cap (M20)(SE-2-9)	cum	0.7194705		
iii)	Haunch concrete (M15)(SE-2-6)	cum	0.81		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	4.1898676		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	41.754321		
vi)	C.I steps (MA-SP-23)	each	8		
vii)	CI frame & cover(MA-SP-13-d)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.9		
ix)	Vata (1:1)(SE-4-8)	cum	0.056		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	4.95		
	Per unit Cost	No			
R2-SE-6-8-a	Extra over above per metre depth above 2.9 M. and upto 5 M. depth -do- -do-				
	Depth: 5-2.9=2.1				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	5.439		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	31.08		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.1		
f)	Safety Chain	No	1		
	Overhead @ 5%		0.05		
	Per Unit Cost	m.dept h			
R2-SE-6-8-b	Do- -do- above 5 M & upto 9 M -do- -do-				
	Depth: 4 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	14.4256		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	62.72		
c	CI steps (5.4 kg)(MA-SP-23)	each	13		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.35508		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4		
	Overhead @ 15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-8-c	Do- -do- above 9.M & upto 11 M -do- -do-				
	Depth: 2 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	10.08		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	33.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.49392		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 20%		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-8-d	Do- -do- above 11M & upto 12 M -do- -do-				
	Depth: 1m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	6.75		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	18		

c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.5814		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1		
	Overhead @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-8-e	Do- -do- above 12 M and upto 14 M depth -do- -do-				
	Depth: 2				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	17.28		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	38.4		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6354		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 35%		0.35		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-9	Constructing on sewer brick masonry scraper Robohole 1.8M x 1.5M at bottom and 1.2M x 0.9M at top , including C.I. EHD airtight rectangular frame and cover weighing minimum 900 kg etc. complete as per description in item No. SE-6-1 depth upto 2.9M				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	2.22912		
ii)	CC Cap (M20)(SE-2-9)	cum	0.7336159		
iii)	Haunch concrete (M15)(SE-2-6)	cum	1.215		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	4.4742499		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	43.958261		
vi)	C.I steps (MA-SP-23)	each	8		
vii)	CI frame & cover(MA-SP-13-d)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.9		
ix)	Vata (1:1)(SE-4-8)	cum	0.058		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	5.4		
	Per unit Cost	No			
R2-SE-6-9-a	Extra over above per metre depth above 2.9 M. and upto 5 M. depth -do- -do-				
	Depth: 5-2.9=2.1				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	5.88		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	33.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.52		
f)	Safety Chain	No	1		
	Overhead @ 5%		0.05		
	Per Unit Cost	m.dept h			
R2-SE-6-9-b	Do- -do- above 5 M & upto 9 M -do- -do-				
	Depth: 4 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	15.5296		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	67.52		
c	CI steps (5.4 kg)(MA-SP-23)	each	13		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.37488		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.8		

	Overhead @ 15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-9-c	Do- -do- above 9.M & upto 11 M -do- -do- Depth: 2 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	10.8		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	36		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.51912		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.4		
	Overhead @ 20%		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-9-d	Do- -do- above 11M & upto 12 M -do- -do- Depth: 1m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	7.2		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	19.2		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6084		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1.2		
	Overhead @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-9-e	Do- -do- above 12 M and upto 14 M depth -do- -do- Depth: 2				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	18.36		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	40.8		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6624		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 35%		0.35		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-10	Constructing on sewer brick masonry scraper Robohole 1.8M x 1.8M at bottom and 1.2M x 0.9M at top , including C.I. Rectangular heavy airtight frame and cover weighing minimum 901 kg etc. complete as per description in item No. SE-6-1 depth upto 2.9M				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	2.48832		
ii)	CC Cap (M20)(SE-2-9)	cum	0.7487264		
iii)	Haunch concrete (M15)(SE-2-6)	cum	1.458		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	4.7653093		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	46.222425		
vi)	C.I steps (MA-SP-23)	each	8		
vii)	CI frame & cover(MA-SP-13-d)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.9		
ix)	Vata (1:1)(SE-4-8)	cum	0.06		

x)	Channel Plaster (1:1)(SE-4-8)	sq m	6.48		
	Per unit Cost	No			
R2-SE-6-10-a	Extra over above per metre depth above 2.9 M. and upto 5 M. depth -do- -do- Depth: 5-2.9=2.1				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	6.321		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	36.12		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.1		
f)	Safety Chain	No	1		
	Overhead @ 5%		0.05		
	Per Unit Cost	m.dept h			
R2-SE-6-10-b	Do- -do- above 5 M & upto 9 M -do- -do- Depth: 4 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	16.6336		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	72.32		
c	CI steps (5.4 kg)(MA-SP-23)	each	13		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.39468		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4		
	Overhead @ 15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-10-c	Do- -do- above 9.M & upto 11 M -do- -do- Depth: 2 m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	11.52		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	38.4		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.54432		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 20%		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-10-d	Do- -do- above 11M & upto 12 M -do- -do- Depth: 1m				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	7.65		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	20.4		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6354		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1		
	Overhead @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-10-e	Do- -do- above 12 M and upto 14 M depth -do- -do- Depth: 2				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	19.44		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	43.2		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6894		

e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 35%		0.35		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-11-a	Constructing brick masonry scraper type Robohole on sewer 2.4M x 1.5M at bottom and 1.2M x 0.9M at top built in brick masonry in C.M. 1:3 -do- -do- as per item No. SE-6-8 including C.I. Rectangular EHD air tight frame and cover (weighing minimum 900 kg), safety chain extra C.I. steps depth upto 4.5M				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	2.69352		
ii)	CC Cap (M20)(SE-2-9)	cum	0.7762507		
iii)	Haunch concrete (M15)(SE-2-6)	cum	2.025		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	10.122513		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	71.890275		
vi)	C.I steps (MA-SP-23)	each	9		
vii)	CI frame & cover(MA-SP-13-d)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.5		
ix)	Vata (1:1)(SE-4-8)	cum	0.066		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	6.3		
xi)	Overhead @ 5% for additional depth		0.05		
xii)	Safety Chain	No	1		
	Per Unit Cost	No			
R2-SE-6-11-b	Extra over above per metre depth above 4.5 M. and upto 9 M. depth -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	19.9548		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	86.76		
c	CI steps (5.4 kg)(MA-SP-23)	each	14		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.41448		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.5		
	Overhead @ 15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-11-c	Do- -do- above 9M & upto 11 M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	12.24		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	40.8		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.56952		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 20%		0.2		
	Per Unit Cost	m			
R2-SE-6-11-d	Do- -do- above 11.M & upto 12M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	8.1		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	21.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.6624		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		

	Overhead @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-11-e	Do- -do- above 12M & upto 14M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	20.52		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	45.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.7164		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 35%		0.35		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-12	Constructing brick masonry scraper type Robohole on sewer 2.4M x 2.4M at bottom and 1.2M x 0.9M at top built in brick masonry in C.M. 1:3 -do- -do- as per item no. SE-6-10 including C.I. Rectangular EHD airtight frame and cover weighing minimum 900 kg, safety chain extra C.I. steps depth upto 4.5 M.				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	3.63312		
ii)	CC Cap (M20)(SE-2-9)	cum	0.8305541		
iii)	Haunch concrete (M15)(SE-2-6)	cum	3.24		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	11.981491		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	84.113727		
vi)	C.I steps (MA-SP-23)	each	14		
vii)	CI frame & cover(MA-SP-13-d)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.5		
ix)	Safety Chain	No	1		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	10.08		
xi)	Vata (1:1)(SE-4-8)	cum	0.096		
xii)	Overhead @ 5% for additional depth		0.05		
	Per Unit Cost	No			
R2-SE-6-12-a	Extra over above per metre depth above 4.5 M. and upto 9 M. depth -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	23.6808		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	102.96		
c	CI steps (5.4 kg)(MA-SP-23)	each	14		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.47388		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.5		
	Overhead @ 15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-12-b	Do- -do- above 9M & upto 11 M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	14.4		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	48		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.64512		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 20%		0.2		
	Per Unit Cost	m.dept			

		h			
R2-SE-6-12-c	Do- -do- above 11.M & upto 12M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	9.45		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	25.2		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.7434		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1		
	Overhead @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-12-d	Do- -do- above 12M & upto 14M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	23.76		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	52.8		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.7974		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2		
	Overhead @ 35%		0.35		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-13	Constructing brick masonry scraper type Robohole on sewer 3M x 2M at bottom and 1.2M x 0.9M at top built in brick masonry in C.M. 1:3 -do- -do- as per item no. SE-6-10 including C.I. Rectangular EHD airtight frame and cover weighing minimum 900 kg to depth upto 4.5 M.				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	3.76992		
ii)	CC Cap (M20)(SE-2-9)	cum	0.7807813		
iii)	Haunch concrete (M15)(SE-2-6)	cum	3.78		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	10.994805		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	78.209685		
vi)	C.I steps (MA-SP-23)	each	9		
vii)	CI frame & cover(MA-SP-13-d)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.68		
ix)	Safety Chain	No	1		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	9.6		
xi)	Vata (1:1)(SE-4-8)	cum	0.09216		
xii)	Overhead @ 5% for additional depth		0.05		
	Per Unit Cost	No			
R2-SE-6-13-a	Extra over above per metre depth above 4.5 M. and upto 9 M. depth -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	23.7806		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	106.12		
c	CI steps (5.4 kg)(MA-SP-23)	each	14		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.48708		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.5		
	Overhead @ 15%		0.15		
	Per Unit Cost	m.dept h			

R2-SE-6-13-b	Do- -do- above 9M & upto 11 M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	14.88		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	49.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.66192		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.08		
	Overhead @ 20%		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-13-c	Do- -do- above 11.M & upto 12M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	9.75		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	26		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.7614		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1		
	Overhead @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-13-d	Do- -do- above 12M & upto 14M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	24.48		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	54.4		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.8154		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.08		
	Overhead @ 35%		0.35		
	Per Unit Cost	m.dept h			
Code No	Description	Unit	Qty		
R2-SE-6-14	Constructing brick masonry scraper type Robohole on sewer 3M x 3M at bottom and 1.2M x 0.9M at top built in brick masonry in C.M. 1:3 -do- -do- as per item no.SE-6-10 including C.I. Rectangular EHD aritight frame and cover weighing minimum 900 kg, safety chain extra C.I. steps depth upto 4.5 M.				
MA	Material				
i)	Bed Concrete(M15)(SE-2-4)	cum	4.99392		
ii)	CC Cap (M20)(SE-2-9)	cum	0.8199306		
iii)	Haunch concrete (M15)(SE-2-6)	cum	5.67		
iv)	B.M in cement mortar 1:3(SE-3-8A)	cum	12.676862		
v)	20mm plaster in CM 1:2(SE-4-4)	sq m	89.1561		
vi)	C.I steps (MA-SP-23)	each	9		
vii)	CI frame & cover(MA-SP-13-d)	no	1		
viii)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	4.68		
ix)	Safety Chain	No	1		
x)	Channel Plaster (1:1)(SE-4-8)	sq m	14.4		
xi)	Vata (1:1)(SE-4-8)	cum	0.13824		
xii)	Overhead @ 5% for additional depth		0.05		
	Per Unit Cost	No			
R2-SE-6-14-a	Extra over above per metre depth above 4.5 M. and upto 9 M. depth -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	27.8106		

b	20mm plaster in CM 1:2(SE-4-4)	sq.m	124.12		
c	CI steps (5.4 kg)(MA-SP-23)	each	14		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.55308		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	5.985		
	Overhead @ 15%		0.15		
	Per Unit Cost	m.dept h			
R2-SE-6-14-b	Do- -do- above 9M & upto 11 M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	17.28		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	57.6		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.74592		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.7664		
	Overheads		0.2		
	Per Unit Cost	m.dept h			
R2-SE-6-14-c	Do- -do- above 11.M & upto 12M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	11.25		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	30		
c	CI steps (5.4 kg)(MA-SP-23)	each	3		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.8514		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	1.33		
	Overhead @ 25%		0.25		
	Per Unit Cost	m.dept h			
R2-SE-6-14-d	Do- -do- above 12M & upto 14M -do- -do-				
a	B.M in cement mortar 1:3(SE-3-8A)	cum	28.08		
b	20mm plaster in CM 1:2(SE-4-4)	sq.m	62.4		
c	CI steps (5.4 kg)(MA-SP-23)	each	6		
d	Extra for foundation concrete (m15)(SE-2-4)	cum	0.9054		
e)	Extra for centering & Scaffolding (R2-CS-CW-30-a)	m	2.7664		
	Overhead @ 35%		0.35		
	Per Unit Cost	m.dept h			

R2-SE-8-1	Constructing brick masonry inspection chamber rectangular 0.9M x 0.45M and 0.6M deep on sewer with 230mm brick walls in cement mortar 1:3 plastered both inside & outside with 20 mm thick cement mortar 1:2 and neat cement rendering so as to give a smooth surface including 230mm cement concrete bedding (M 15) and cement concrete (M 15) in haunches and channels finished smooth with 20 mm thick cement mortar(1:1) and fixing C.I. extra heavy duty airtight rectangular frame & cover of size 0.9M x 0.45M weighing minimum 225Kg. resting on 300 mm high c.c. cap M 20 with (1:1) cement plaster on both the sides & necessary C.I. steps (weighing 5.4 kg each)staggered at 300mm c/c. including 75 mm wide vata all round the external portion of the chamber and the foundation concrete in C.M. 1:1 etc. complete as per plan in Dy.Ch.E.(SP)P&D's office(without excavation) .	No			
-----------	---	----	--	--	--

	Finished Items				
1	Bed Concrete(M15)(SE-2-4)	cum	0.52		
2	CC Cap (M20)(SE-2-9)	cum	0.26		
3	Haunch concrete (M15)(SE-2-6)	cum	0.09		
4	B.M in cement mortar 1:3(SE-3-8A)	cum	0.26		
5	20mm plaster in CM 1:2(SE-4-4)	sq.m	4.45		
6	CI frame & cover 0.9M x 0.45M	No	1		
7	C.I steps (MA-SP-23)	No	1		
8	Vata (1:1)(SE-4-8)	cum	0.0266		
9	Extra for centering & Scaffolding (R2-CS-CW-24-a)	cum	0		
10	Channel Plaster (1:1)(SE-4-8)	Sqm	0.405		
	Per Unit Cost	Rs/No			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-1-a	Extra over above for every additional metre depth upto 2.5M -do- -do-with necessary centering etc. all complete as per direction.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.62		
2	Plastering-20mm thick(1:2)	sq.m	7.6		
3	CI steps(providing and Fixing)	No	6		
	Per Unit Cost	m			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-2	Constructing brick masonry inspection chamber rectangular 0.9M x 0.6M and 0.6M deep -do- including M 20, 30 cm thick cap c.c. Bedding & including C.I. extra heavy duty air tight frame and cover weighing minimum 270kg complete as per description in item No. SE-8-1 with necessary centering etc. all complete as per plan and directed.	No			
	Finished Items				
1	Bed Concrete(M15)(SE-2-4)	cum	0.75		
2	CC Cap (M20)(SE-2-9)	cum	0.3		
3	Haunch concrete (M15)(SE-2-6)	cum	0.12		
4	B.M in cement mortar 1:3(SE-3-8A)	cum	0.3		
5	20mm plaster in CM 1:2(SE-4-4)	sq.m	5.02		
6	Frame and cover (0.9m x 0.6m)	No	1		
7	CI steps(providing and Fixing)	No	1		
8	Vata (1:1)(SE-4-8)	cum	0.0266		
9	Extra for centering & Scaffolding (R2-CS-CW-24-a)	cum	0		
10	Channel Plaster (1:1)(SE-4-8)	sqm	0.54		
	Per Unit Cost	Rs/No			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-2-a	Extra over above for every additional metre depth upto 2.5M -do- -do-with necessary centering etc. all complete as per direction.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.9		
2	Plastering-20mm thick(1:2)	sq.m	8.4		
3	CI steps(providing and Fixing)	No	6		
A	Total				

	Per Unit Cost	m			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-3	Constructing brick masonry inspection chamber rectangular 0.75M x 0.75M and 0.6M deep -do- -do- as per description in item no SE-8-1 including CI extra heavy duty air tight frame and cover weighing minimum 275 kg complete as per plan and directed	No			
	Finished Items				
1	Bed Concrete(M15)(SE-2-4)	cum	0.243		
2	CC Cap (M20)(SE-2-9)	cum	0.3		
3	Haunches and Channels in CC (M15)	cum	0.13		
4	B.M in cement mortar 1:3(SE-3-8A)	cum	0.4		
5	Plastering-20mm thick(1:2)	sq.m	4.8		
6	Frame and cover	No	1		
7	CI steps(providing and Fixing)	No	1		
8	Vata (1:1)	cum	0.028		
9	Channel plaster (1:1)	sqm	0.45		
A	Total				
	Per Unit Cost	Rs/No			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-3-a	Extra over above for every additional metre depth upto 2.M -do- -do-with necessary centering etc. all complete as per direction.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.4		
2	Plastering-20mm thick(1:2)	sq.m	6.72		
3	CI steps(providing and Fixing)	No	4		
A	Total				
	Per Unit Cost	m			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-4	Constructing brick masonry inspection chamber rectangular 0.6M x 0.6M and 0.6M deep -do- -do- etc. complete as per description in item no SE-8-1 including CI extra heavy duty air tight frame and cover weighing minimum 200 kg complete as per plan and directed.	No			
	Finished Items				
1	Bed Concrete(M15)(SE-2-4)	cum	0.168		
2	CC Cap (M20)(SE-2-9)	cum	0.24		
3	Haunches and Channels in CC (M15)	cum	0.09		
4	B.M in cement mortar 1:3(SE-3-8A)	cum	0.34		
5	Plastering-20mm thick(1:2)	sq.m	4.22		
6	Frame and cover	No	1		
7	CI steps(providing and Fixing)	No	1		
8	Vata (1:1)	cum	0.01792		
9	Channel plaster (1:1)	sqm	0.288		
A	Total				
	Per Unit Cost	Rs/No			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-4-a	Extra over above for every additional metre depth upto 2.M -do- -	No			

	do-with necessary centering etc. all complete as per direction.				
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.19		
2	Plastering-20mm thick(1:2)	sq.m	6.08		
3	CI steps(providing and Fixing)	No	4		
A	Total				
	Per Unit Cost	m			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-5	Constructing brick masonry inspection chamber rectangular 0.9M x 0.45M and 0.6M deep on sewer with 230mm brick walls in cement mortar 1:3 plastered both inside & outside with 20 mm thick cement mortar 1:2 and neat cement rendering so as to give a smooth surface including 230mm cement concrete bedding (M 15) and cement concrete (M 15) in haunches and channels finished smooth with 20 mm thick cement mortar (1:1) and fixing SFRC extra heavy duty rectangular frame & cover of size 0.9M x 0.45M. resting on 300 mm high c.c. cap M 20 with (1:1) cement plaster on both the sides & necessary co-polymer. steps staggered at 300mm c/c. including 75 mm wide vata all round the external portion of the chamber and the foundation concrete in C.M. 1:1 etc. complete as per plan in Dy.Ch.E.(SP)P&D's office(without excavation) .	No			
	Finished Items				
1	Bed Concrete(M15)(SE-2-4)	cum	0.52		
2	CC Cap (M20)(SE-2-9)	cum	0.26		
3	Haunches and Channels in CC (M15)	cum	0.09		
4	B.M in cement mortar 1:3(SE-3-8A)	cum	0.3		
5	Plastering-20mm thick(1:2)	sq.m	4.45		
6	SFRC Frame and cover	No	1		
7	Copolymer steps(providing and Fixing)	No	1		
8	Vata (1:1)	cum	0.02		
9	Channel plaster (1:1)	sqm	0.38		
A	Total				
	Per Unit Cost	Rs/No			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-5-a	Extra over above for every additional metre depth upto 2.5M -do- -do-with necessary centering etc. all complete as per direction.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.62		
2	Plastering-20mm thick(1:2)	sq.m	7.6		
3	Copolymer steps(providing and Fixing)	No	6		
	Per Unit Cost	m			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-6	Constructing brick masonry inspection chamber rectangular 0.9M x 0.6M and 0.6M deep -do- including M 20, 30 cm thick cap c.c. Bedding & including SFRC extra heavy duty frame and cover complete as per description in item No. SE-8-5 etc. all complete as per direction.	No			

	Finished Items				
1	Bed Concrete(M15)(SE-2-4)	cum	0.75		
2	CC Cap (M20)(SE-2-9)	cum	0.28		
3	Haunches and Channels in CC (M15)	cum	0.12		
4	B.M in cement mortar 1:3(SE-3-8A)	cum	0.345		
5	Plastering-20mm thick(1:2)	sq.m	5.02		
6	SFRC Frame and cover	No	1		
7	Copolymer steps(providing and Fixing)	No	1		
8	Vata (1:1)	cum	0.0266		
9	Channel plaster (1:1)	sqm	0.5054		
A	Total				
	Per Unit Cost	Rs/No			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-6-a	Extra over above for every additional metre depth upto 2.5M -do- -do-with necessary centering etc. all complete as per direction.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	2.185		
2	Plastering-20mm thick(1:2)	sq.m	8.4		
3	Copolymer steps(providing and Fixing)	No	6		
A	Total				
	Per Unit Cost	m			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-7	Constructing brick masonry inspection chamber rectangular 0.75M x 0.75M and 0.6M deep -do- -do- as per description in item no SE-8-5 including SFRC extra heavy duty frame and cover complete as per direction.	No			
	Finished Items				
1	Bed Concrete(M15)(SE-2-4)	cum	0.58		
2	CC Cap (M20)(SE-2-9)	cum	0.28		
3	Haunches and Channels in CC (M15)	cum	0.13		
4	B.M in cement mortar 1:3(SE-3-8A)	cum	1.7		
5	Plastering-20mm thick(1:2)	sq.m	5.04		
6	SFRC Frame and cover	No	1		
7	Copolymer steps(providing and Fixing)	No	4		
8	Vata (1:1)	cum	0.028		
9	Channel plaster (1:1)	sqm	0.45		
A	Total				
	Per Unit Cost	Rs/No			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-7-a	Extra over above for every additional metre depth upto 2.M -do- -do-with necessary centering etc. all complete as per direction.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.4		
2	Plastering-20mm thick(1:2)	sq.m	6.72		
3	Copolymer steps(providing and Fixing)	No	4		
A	Total				
	Per Unit Cost	m			

Code No	Description	Unit/pe r	Qty		
R2-SE-8-8	Constructing brick masonry inspection chamber rectangular 0.6M x 0.6M and 0.6M deep -do- -do- etc. complete as per description in item no SE-8-5 including SFRC extra heavy duty frame and cover complete as per direction.	No			
	Finished Items				
1	Bed Concrete(M15)(SE-2-4)	cum	0.45		
2	CC Cap (M20)(SE-2-9)	cum	0.24		
3	Haunches and Channels in CC (M15)	cum	0.09		
4	B.M in cement mortar 1:3(SE-3-8A)	cum	1.44		
5	Plastering-20mm thick(1:2)	sq.m	4.22		
6	SFRC Frame and cover	No	1		
7	Copolymer steps(providing and Fixing)	No	4		
8	Vata (1:1)	cum	0.01792		
9	Channel plaster (1:1)	sqm	0.288		
A	Total				
	Per Unit Cost	Rs/No			
Code No	Description	Unit/pe r	Qty		
R2-SE-8-8-a	Extra over above for every additional metre depth upto 2.M -do- -do-with necessary centering etc. all complete as per direction.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.19		
2	Plastering-20mm thick(1:2)	sq.m	6.08		
3	Copolymer steps(providing and Fixing)	No	4		
A	Total				
	Per Unit Cost	m			
Drop Arrangement					
Code No	Description	Unit/pe r	Qty		
R2-SE-7-1	Providing 150 mm dia stone ware pipes of SP2 class in vertical drop of 0.6M including 150 mm dia stone ware pipe fixed in brick masonry of the Robohole at required level & providing 150 mm dia stone ware right angled bend, 150 mm x 150 mm x 150 mm S.W. double tee junction including cutting, jointing & filleting as per detailed specifications, encased in half brick thick masonry in cement mortar (1:3) all round the pipes double tee, bend and extra brick work below bend upto the foundation of the Robohole and tapering portion of the Robohole plastering the exposed surfaces after raking out the joints of the masonry to a depth of 20 mm in C.M. (1:2) 20 mm thick and neat cement rendering so as to give a smooth surface, including plugging the openings etc. complete as directed and as per drawing in Dy.Ch.E.(S.P.)P&D's office.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.16		
2	Plastering-20mm thick(1:2)	sq.m	1.6		
3	Stoneware 150mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.04		
5	Stoneware 150mm Bend	No	1		
6	Stoneware 150mm diameter pipe	No	1		
7	Plug	No	1		

	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-1-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.173		
2	Plastering-20mm thick(1:2)	sq.m	1.35		
3	Pipe 150mm dia of 1 metre	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-2	Do- -do- 230 mm dia stone ware pipe for vertical drop upto 0.6M - do- -do- as per item SE-7-1	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.29		
2	Plastering-20mm thick(1:2)	sq.m	2.386		
3	Stoneware 230mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.075		
5	Stoneware 230mm Bend	No	1		
6	Stoneware 230mm dia pipe	No	1		
7	Plug	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-2-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.27		
2	Plastering-20mm thick(1:2)	sq.m	1.74		
3	Pipe 230mm dia of 1 metre	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-3	Do- -do- 300mm dia stone ware pipe for vertical drop upto 0.6M - do- -do- as per item SE-7-1	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.345		
2	Plastering-20mm thick(1:2)	sq.m	2.1		
3	Stoneware 300mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.1		
5	Stoneware 300mm Bend	No	1		
6	Stoneware 300mm Pipe	No	1		
7	Plug	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		

R2-SE-7-3-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.327		
2	Plastering-20mm thick(1:2)	sq.m	1.92		
3	Pipe 300mm dia of 1 metre	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-4	Providing 160 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 0.6m including 60mm dia HDPE pipes fixed in brick masonry of the Robohole at required level and providing 160mm dia HDPE right angled bend, 160mmx160mmx160mm HDPE double tee junction including cutting and jointing as per detailed specifications,encased in half brick thick masonry in cement mortar (1:3) all round the pipes,double tee,bend and extra brickwork below bend upto the foundation of the Robohole and tapering portion of the Robohole plastering,plastering the exposed surfaces after raking out the joints of the masonry to a depth of 20mm in CM(1:2) 20mm thick and neat cement rendering so as to give smooth surface,including plugging the openings etc complete as directed and as per drawing in Dy CE(SP)P&D's office	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.16		
2	Plastering-20mm thick(1:2)	sq.m	1.6		
3	HDPE 160mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.04		
5	HDPE160mm Bend	No	1		
6	HDPE 160mm diameter pipe	No	1		
7	Plug	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-4-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.173		
2	Plastering-20mm thick(1:2)	sq.m	1.35		
3	HDPE Pipe 160mm dia of 1 metre	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-5	Do- -do- 200 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 0.6M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.2175		
2	Plastering-20mm thick(1:2)	sq.m	1.7895		
3	HDPE 200mm double T	No	1		

4	Bed Concrete(M15)(SE-2-4)	cum	0.05625		
5	HDPE 200mm Bend	No	1		
6	HDPE 200mm dia pipe(0.6m)	No	1		
7	Plug	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-5-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.27		
2	Plastering-20mm thick(1:2)	sq.m	1.74		
3	HDPE Pipe 200mm dia of 1 metre	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-6	Do- -do- 250 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 0.6M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.2415		
2	Plastering-20mm thick(1:2)	sq.m	1.68		
3	HDPE 250mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.07		
5	HDPE 250mm Bend	No	1		
6	HDPE 250mm Pipe (0.6m length)	No	1		
7	Plug	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-6-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.327		
2	Plastering-20mm thick(1:2)	sq.m	1.92		
3	HDPE Pipe 250mm dia of 1 metre	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-7	Do- -do- 280 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 0.6M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.3105		
2	Plastering-20mm thick(1:2)	sq.m	1.89		
3	HDPE 280mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.09		
5	HDPE 280mm Bend	No	1		

6	HDPE 280mm Pipe of 0.6m length	No	1		
7	Plug	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-7-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.327		
2	Plastering-20mm thick(1:2)	sq.m	1.92		
3	Pipe 280mm dia of 1 metre	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-8	Do- -do- 315 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 0.9M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.84		
2	Plastering-20mm thick(1:2)	sq.m	4.41		
3	HDPE 315mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.136		
5	HDPE 315 mm Bend	No	1		
6	HDPE 315mm Pipe of 0.9m length	No	1		
7	Plug	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-8-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.352		
2	Plastering-20mm thick(1:2)	sq.m	2.04		
3	Pipe 315mm dia of 1 metre	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-9	Do- -do- 355 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 0.9M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.05		
2	Plastering-20mm thick(1:2)	sq.m	4.9		
3	HDPE 355mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.18		
5	HDPE 355 mm Bend	No	1		
6	HDPE 355mm Pipe of 0.9m	No	1		
7	Plug	No	1		
	Per Unit Cost	No			

Code No	Description	Unit/pe r	Qty		
R2-SE-7-9-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.44		
2	Plastering-20mm thick(1:2)	sq.m	2.4		
3	Pipe 350mm dia of 1 metre	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-10	Do- -do- 400 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 0.9M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.21		
2	Plastering-20mm thick(1:2)	sq.m	5.56		
3	HDPE 400mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.19		
5	HDPE 400mm Bend	No	1		
6	HDPE 400mm Pipe of 0.9 m	No	1		
7	Plug	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-10-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.49		
2	Plastering-20mm thick(1:2)	sq.m	2.55		
3	Pipe 400mm dia of 1 metre	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-11	Do- -do- 450 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 1.2M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.42		
2	Plastering-20mm thick(1:2)	sq.m	6.31		
3	HDPE 450mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.2		
5	HDPE 450mm Bend	No	1		
6	HDPE 450mm Pipe of 1.2 m	No	1		
7	Plug	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-11-a	Extra over above per additional metre depth -do- -do- as per above item.	No			

	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.53		
2	Plastering-20mm thick(1:2)	sq.m	2.7		
3	Pipe 450mm dia of 1 metre	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-12	Do- -do- 500 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 1.2M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.51		
2	Plastering-20mm thick(1:2)	sq.m	7.62		
3	HDPE 500mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.23		
5	HDPE 500mm Bend	No	1		
6	HDPE 500mm Pipe of 1.2 m length	No	1		
7	Plug	No	1		
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-12-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.58		
2	Plastering-20mm thick(1:2)	sq.m	2.81		
3	Pipe 500mm dia of 1 metre length	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-13	Do- -do- 560 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 1.2M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.585		
2	Plastering-20mm thick(1:2)	sq.m	8.04		
3	HDPE 560mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.26		
5	HDPE 560mm Bend	No	1		
6	HDPE 560mm Pipe of 1.2 m length	No	1		
7	Plug	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-13-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.58		
2	Plastering-20mm thick(1:2)	sq.m	2.85		
3	Pipe 560mm dia of 1 metre length	No	1		

A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-14	Do- -do- 630 mm dia HDPE pipes of PE-80 grade and PN-6 class in vertical drop of 1.2M -do- -do- as in item No.SE-7-4	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	1.66		
2	Plastering-20mm thick(1:2)	sq.m	8.46		
3	HDPE 630mm double T	No	1		
4	Bed Concrete(M15)(SE-2-4)	cum	0.29		
5	HDPE 630mm Bend	No	1		
6	HDPE 630mm Pipe of 1.2m length	No	1		
7	Plug	No	1		
A	Total				
	Per Unit Cost	No			
Code No	Description	Unit/pe r	Qty		
R2-SE-7-14-a	Extra over above per additional metre depth -do- -do- as per above item.	No			
	Finished Items				
1	B.M in cement mortar 1:3(SE-3-8A)	cum	0.67		
2	Plastering-20mm thick(1:2)	sq.m	3.18		
3	Pipe 630mm dia of 1 metre length	No	1		
A	Total				
	Per Unit Cost	No			

R2-SE-14-1 to R2-SE-14-1-g	Installation of 280mm-630 dia (OD) HDPE pipe line (PN 6 Class-PE 80 grade IS 14333) to correct grade and alignment using Horizontal Directional Drilling method in any type of ground including soft soil, mixed ground and soft/hard rock.				
	RATE ANALYSIS FOR HDD OPERATIONS (PN6-PE-80)	UNIT	AMOUNT		
	OWNING COST				
	Ex-works price - Drilling Rig with mud mixer and digitrack (TT 20s rig)	USD			
A1	Total	USD			
A2	Customs				
A3	Clearing & Forwarding Charges	USD			
A4	GST				
A5	Transportation from Port to Site				
	Sub total	USD			
	Total Investment	USD			
	Economic Life for business	Year(s)			
	Working Life in hours	Hour(s)			
	Resale Value 10% of the Purchase Cost)	USD			
	CAPITAL COST	USD			
	INTEREST COST	USD			
	Period of loan	Years			
	Interest rate				

	Outgoings Per month for 85% loan				
	Loan payment over tenure				
	Interest cost				
	Hourly capital and interest cost				
	Total Owning cost in USD	USD/hr.			
	Total Owning cost in INR	Rs./hr.			
	Spares, Cutters, Scrapers cost				
	Considering cost for spare and consumbles as 20% of machine cost per meter	Rs./hr.			
	OPERATING COST				
	Equipment				
	Fuel Consumption	Lit./hr.			
	Fuel Cost	Rs./ltr.			
	Total Fuel Cost	Rs./hr.			
	Mud Mixing Unit + Trucking Cost (7.5% of Owning)	Rs./hr.			
	Lub, Oil, Grease, Filter etc. (25% of fuel)	Rs./hr.			
	General maintenance of the equipment (55% of Owning)	Rs./hr.			
	Operating Team Cost (30% of Owning)	Rs./hr.			
	Supervisor / Misc Expenses (5% of Owning)	Rs./hr.			
	Misc Works (Pit/Pipe Pulling/Pipe Pushing) (10% of Owning)	Rs./hr.			
	Shifting Charges (5% of Owning)	Rs./hr.			
	Communication Cost (5% of Owning)	Rs./hr.			
	SUB TOTAL	Rs./hr.			
	Consumables (Average for 400mm dia bore)				
	Foam + Polymer	Per 100mts			
	Mud Disposal Cost (10%)	Per 100mts			
	Water	Per 100mts			
	TOTAL COST OF WATER AND MUD	Per mt			
	PRODUCTIVITY Average Speed of boring & Backreaming				
	160mm	M/Hr.			
	200mm	M/Hr.			
	280mm	M/Hr.			
	315mm	M/Hr.			
	355mm	M/Hr.			
	400mm	M/Hr.			
	450mm	M/Hr.			
	500mm	M/Hr.			
	560mm	M/Hr.			
	630mm	M/Hr.			
	Total Owning and Operating Cost	Rs./Mtr			
	160mm	Per m			
	200mm	Per m			
	280mm	Per m			
	315mm	Per m			
	355mm	Per m			
	400mm	Per m			
	450mm	Per m			

	500mm	Per m			
	560mm	Per m			
	630mm	Per m			
	COST OF PIPE AND JOINTING	Per Joint			
	160mm	Per m			
	200mm	Per m			
	280mm	Per m			
	315mm	Per m			
	355mm	Per m			
	400mm	Per m			
	450mm	Per m			
	500mm	Per m			
	560mm	Per m			
	630mm	Per m			
	TOTAL COST OF HDD OPERATIONS (Including overheads@ 15%)				
	160mm	Per m			
	200mm	Per m			
	TOTAL COST OF HDD OPERATIONS (Including overheads@ 15%)				
	280mm	Per m			
	315mm	Per m			
	355mm	Per m			
	400mm	Per m			
	450mm	Per m			
	500mm	Per m			
	560mm	Per m			
	630mm	Per m			
R2-SE-14-2 to R2-SE-14-2-c					
	RATE ANALYSIS FOR HDD OPERATIONS (PN6-PE-100)	UNIT			
	OWNING COST				
	Ex-works price - Drilling Rig with mud mixer and digitrack (TT 20s rig)	USD			
A1	Total	USD			
A2	Customs(26.85%)				
A3	Clearing & Forwarding Charges	USD			
A4	GST				
A5	Transportation from Port to Site				
	Sub total				
	Total Investment	USD			
	Economic Life for business	Year(s)			
	Working Life in hours	Hour(s)			
	Resale Value 10% of the Purchase Cost)	USD			
	CAPITAL COST	USD			
	INTEREST COST	USD			
	Period of loan	Years			
	Interest rate				
	Outgoings Per month for 85% loan				
	Loan payment over tenure				
	Interest cost				
	Hourly capital and interest cost				

	Total Owning cost in USD	USD/hr.			
	Total Owning cost in INR	Rs./hr.			
	Spares, Cutters, Scrapers cost				
	Considering cost for spare and consumables as 25% of machine cost per meter	Rs./hr.			
	OPERATING COST				
	Equipment				
	Fuel Consumption	Lit./hr.			
	Fuel Cost	Rs./hr.			
	Total Fuel Cost (nxo)	Rs./hr.			
	Mud Mixing Unit + Trucking Cost (7.5% of Owning)	Rs./hr.			
	Lub, Oil, Grease, Filter etc. (25% of fuel)	Rs./hr.			
	General maintenance of the equipment (55% of Owning)	Rs./hr.			
	Operating Team Cost (30% of Owning)	Rs./hr.			
	Supervisor / Misc Expenses (5% of Owning)	Rs./hr.			
	Misc Works (Pit/Pipe Pulling/Pipe Pushing) (10% of Owning)	Rs./hr.			
	Shifting Charges (5% of Owning)	Rs./hr.			
	Communication Cost (5% of Owning)	Rs./hr.			
	SUB TOTAL	Rs./hr.			
	Consumables (Average for 800 mm dia bore)				
	Foam + Polymer	Per 100mts			
	Mud Disposal Cost (10%)	Per 100mts			
	Water	Per 100mts			
	TOTAL COST OF WATER AND MUD	Per mt			
	PRODUCTIVITY Average Speed of boring & Backreaming				
	710mm	M/Hr.	0.4		
	800mm	M/Hr.	0.4		
	900mm	M/Hr.	0.3		
	1000mm	M/Hr.	0.3		
	Total Owning and Operating Cost	Rs./Mtr			
	710mm	Per m			
	800mm	Per m			
	900mm	Per m			
	1000mm	Per m			
	COST OF PIE AND JOINTING	Per joint			
	710mm	Per m			
	800mm	Per m			
	900mm	Per m			
	1000mm	Per m			
	TOTAL COST OF HDD OPERATIONS (Including overheads@ 15%)				
	710mm	Per m			
	800mm	Per m			
	900mm	Per m			

	1000mm	Per m			
R2-SE-14-3	Pilot inclined dilling from existng ground level upto required depth (invert level) on rig side (i.e. entry side) of proposed sewer line by using Horizontal Directional Drilling method for installation of HDPE pipe line (PN 6 Class-PE 80 / PE 100 grade: IS 14333) for sewer line to correct grade and alignment in any type of ground including soft soil, mixed ground and soft/hard rock.				
	PRODUCTIVITY Average Speed of Initial Pilot inclined boring - 150mm	M/Hr.	4.5		
	Total Owinging and Operating Cost for 150mm Initial Pilot inclined boring	Per m			
R2-SE-14-4	Final inclined boring from existng ground level upto required depth (invert level) or viceversa on pipe side (i.e. exit side) of proposed sewer line by using Horizontal Directional Drilling method for installation of HDPE pipe line (PN 6 Class-PE 80 / PE 100 grade: IS 14333) for sewer line to correct grade and alignment in any type of ground including soft soil, mixed ground and soft/hard rock.				
	PRODUCTIVITY Average Speed of boring & Backreaming				
	280mm	M/Hr.	0.6		
	315mm	M/Hr.	0.6		
	355mm	M/Hr.	0.5		
	400mm	M/Hr.	0.5		
	450mm	M/Hr.	0.5		
	500mm	M/Hr.	0.4		
	560mm	M/Hr.	0.4		
	630mm	M/Hr.	0.4		
	710mm	M/Hr.	0.4		
	800mm	M/Hr.	0.4		
	900mm	M/Hr.	0.3		
	1000mm	M/Hr.	0.3		
	TOTAL COST OF HDD OPERATIONS (Including overheads@ 15%)				
R2-SE-14-4a	280mm	Per m			
R2-SE-14-4b	315mm	Per m			
R2-SE-14-4c	355mm	Per m			
R2-SE-14-4d	400mm	Per m			
R2-SE-14-4e	450mm	Per m			
R2-SE-14-4f	500mm	Per m			
R2-SE-14-4h	560mm	Per m			
R2-SE-14-4i	630mm	Per m			
R2-SE-14-4j	710mm	Per m			
R2-SE-14-4k	800mm	Per m			
R2-SE-14-4l	900mm	Per m			
R2-SE-14-4m	1000mm	Per m			

NOTE: 15% Overheads and Contractor's Profit Includes-Overheads of 5%(1% Labour Cess, 2% Unloading Charges & 2% Water Charges) and Contractor's Profit of 10%

Sign & Seal of the Tenderer

PORTAL COPY

Annexure – ‘I’

Irrevocable Undertaking

(On Rs. 500/- Stamp Paper)

I Shri/Smt aged years. Indian Inhabitant, Proprietor/Partner/Director of M/s.....

resident at do hereby give Irrevocable undertaking as under;

- 1) I say and understand that as specified in section 171 of CGST Act, 2017, any reduction in rate of tax on supply of goods or services or the benefit of input tax credit shall be mandatorily passed on to BMC by way of commensurate reduction in prices.
- 2) I further say and undertake that I understand that in case the same is not passed on and is discovered at any later stage, BMC shall be at liberty to initiate legal action against me for its recovery including, but not limited to, an appeal to the Screening Committee of the GST Counsel.
- 3) I say that above said irrevocable undertaking is binding upon me / my partners /company /other Directors of the company and also upon my/our legal heirs assignee, Executor, administrator etc.
- 4) If I fail to compliance with the provision of the GST Act, I shall be liable for penalty/ Punishment or both as per the provision of GST Act.

Whatever has been stated here in above is true & correct to my/our own knowledge & belief.

Solemnly affirmed at

DEPONENT

This day of

BEFORE ME

Interpreted Explained and Identified by me.

Note :- The bidder shall submit the Irrevocable undertaking on Rs.500/- Stamp Paper as per Annexure ‘I’

PROFORMAS:

PROFORMA- I

The list of similar works as stated in para 'A' of Post qualification during last seven years–

PROFORMA- I					
Sr.No.	Name of the Project	Name of the employer	Stipulated date of completion	Actual date of completion	Actual Cost of work done
1	2	3	4	5	6

NOTE:

Scanned Attested copies of completion/performance certificates from the Engineer-in-Charge for each work should be annexed in the support of information furnished in the above proforma.

Works shall be grouped financial year-wise.

PROFORMA- II

Yearly turnover of Civil Engineering Construction Works during the last seven years.

PROFORMA- II					
Sr.No.	Financial year	Annual Turnover of Civil Engineering Works	Updated value to current year	Average of last 5years	Page No.
1					
2					
3					
4					
5					
Total					

NOTE: The above figures shall tally with the audited balance sheets uploaded by the tenderers duly certified by Chartered Accountant.

PROFORMA- III

Atleast similar work, as stated in para 'A' of Post qualification,.

PROFORMA- III							
Name of the Project	Name of the Employer	Cost of the Project	Date of issue of work Order	Stipulated Date of Completion	Actual Date of Completion	Actual cost of work done	Remarks explaining reasons for delay, if any
1	2	3	4	5	6	7	8

Note: Scanned Attested copies of completion/performance certificates from the Engineer-in-charge for each work should be annexed in support of information furnished in the above proforma.

PERSONNEL:

PROFORMA- IV					
Sr. No.	Post	Name	Qualification	Work Experience	
		(Prime Candidate/ Alternate)		No. of Years	Name of Projects
1	Project Manager				
2	Quality Control Engineer				
3	Site Engineer				
4	Site Supervisor				

NOTE: Scanned Attested copies of qualification certificates and details of work experience shall be submitted /uploaded.

MACHINERY: (for special work only)

PROFORMA- V/A			
Sr. No.	Equipment	Number	Owned/Leased/Assured access
1	2	3	4

PROFORMA- V/B			
Sr. No.	Equipment	Number	Owned
1	2	3	4

Note: The tenderer(s) shall furnish/upload the requisite Scanned Attested documents of ownership/leased of machineries. The undertaking from the suppliers will not be accepted.

PROFORMA - VI / A

Details of Existing Commitments and ongoing works –

PROFORMA - VI / A							
Description of work	Place	Contract No. & Date	Name & Addresses of employer	Value of Contract in Rs.	Scheduled date of completion	Value of work remaining to be completed	Anticipated Date of completion
1	2	3	4	5	6	7	8

Note: Scanned Attested copies of completion/performance certificates from the Engineer-in-Charge for each work should be annexed in the support of information furnished in the above proforma.

PROFORMA - VI / B

Details of works for which bids are already uploaded –

PROFORMA - VI / B							
Description of work	Place	Name & Addresses of employee	Value of Contract in Rs.	Time Period	Date on which decision is expected	Remarks	
1	2	3	4	5	6	7	

Note: Scanned Attested copies of certificates from the Engineer-in-charge for each work shall be annexed.

PROFORMA VII
Equipment Capabilities

Tenderer's Legal Name: [insert full name]

e-Tender No..... Date.....

Item of Equipment	Requirement, Nos.	Owned/ Leased / To be procured	Nos./ Capacity	Age/ Condition	Remarks - (Earliest date of mobilization of the equipment on worksite in Mumbai)
Construction Equipment					
1. HDD Machine with required capacity and ancillary equipments	One				
1. Mobile Crane 20 tons capacity	One				
2. Excavator(5 ton)	Four				
3. Generator 200KVA (440Volts)	Four				
4. Drainage Pumps 20Kw & 10Kw	Four of 20 KW & Four of 10KW				
5. Buried Services Locator.	One				
6. Grouting pump (min 20psi pressure)	Four				
7. Portable Generator (minimum 40KVA)	Four				
8. Welding equipment	Two sets				
9. Vibratory Roller, Minimum 10 t	One				
10.H.D.P.E. Pipe welding machine	Two sets				
11.Trucks	Two				
12.Compressor with Chisel	Two				
13.Hydra	Two				
14 Splitter Machine with operator	Four				
15)HDD machine with required capacity and ancillary equipments capable of laying the pipes ranging from dia. 160mm upto 630mm	ii) 01 no. of HDD machine 160mm - 630 mm dia., he possess, or have assured access to (through hire, lease purchase agreement, availability of manufacturing capacity, or other means) (Tenderer must upload and submit supporting valid documents that he can mobilize on site all of this equipment within 30 days of the acceptance letter).				

Note: The tenderer should submit the above proforma with packet B .

PROFORMA VIII

Tenderer's Legal Name: *[insert full name]*

e-Tender No..... Date.....

Personnel Capabilities

Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach CVs signed by the person or authorized representative of the firm.

Position		Name of Person	Total Experience (years)	In HDD work (years)
	Qualification	Number		
1. Project Manager	Graduate Engineer	01		
2. Project Engineer	Graduate Engineer	01		
3. Site Engineer	Graduate Engineer or Diploma Engineer	04		
4. Billing Engineer	Graduate Engineer	01		

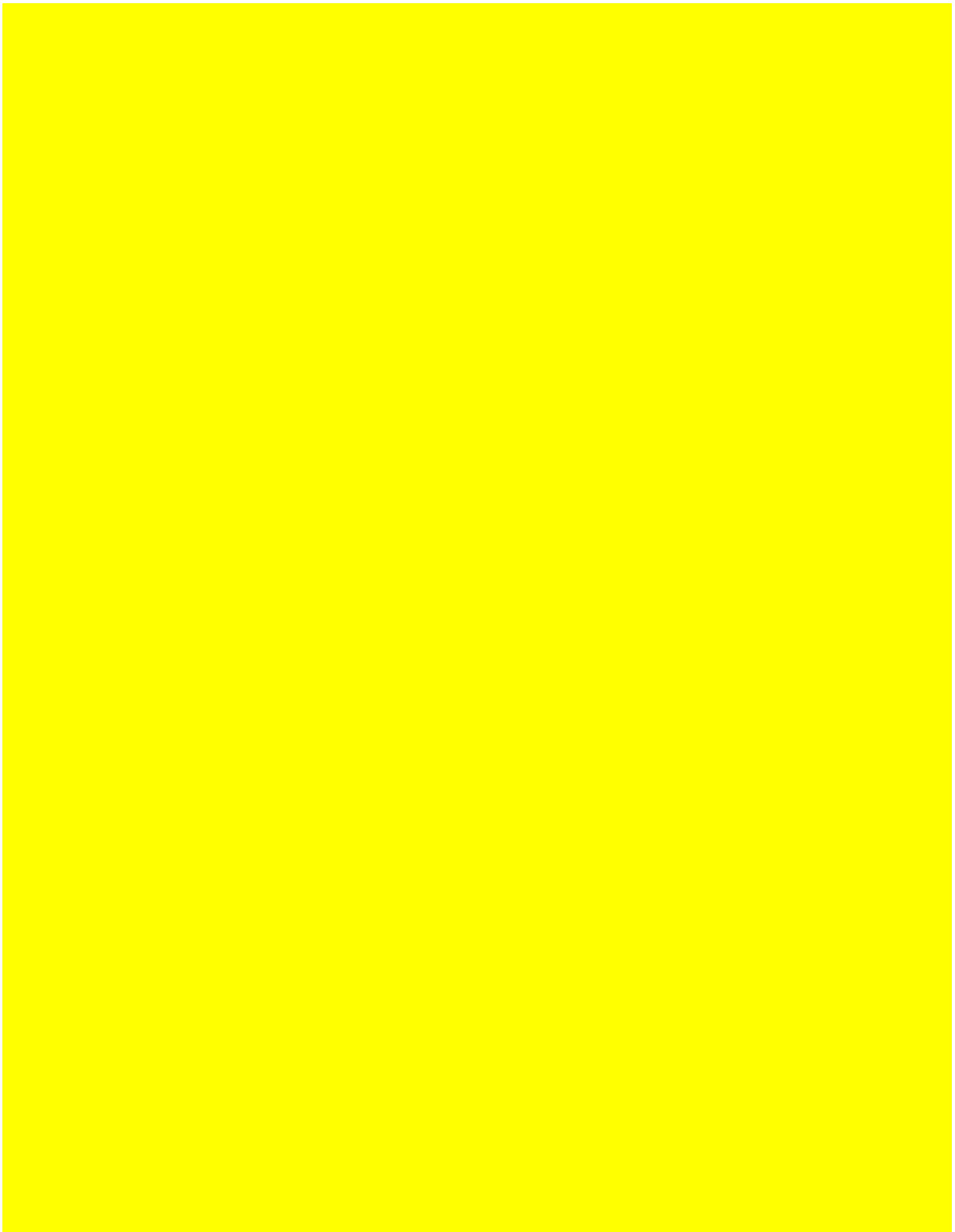
HDD equipment operators' experience (Summary)

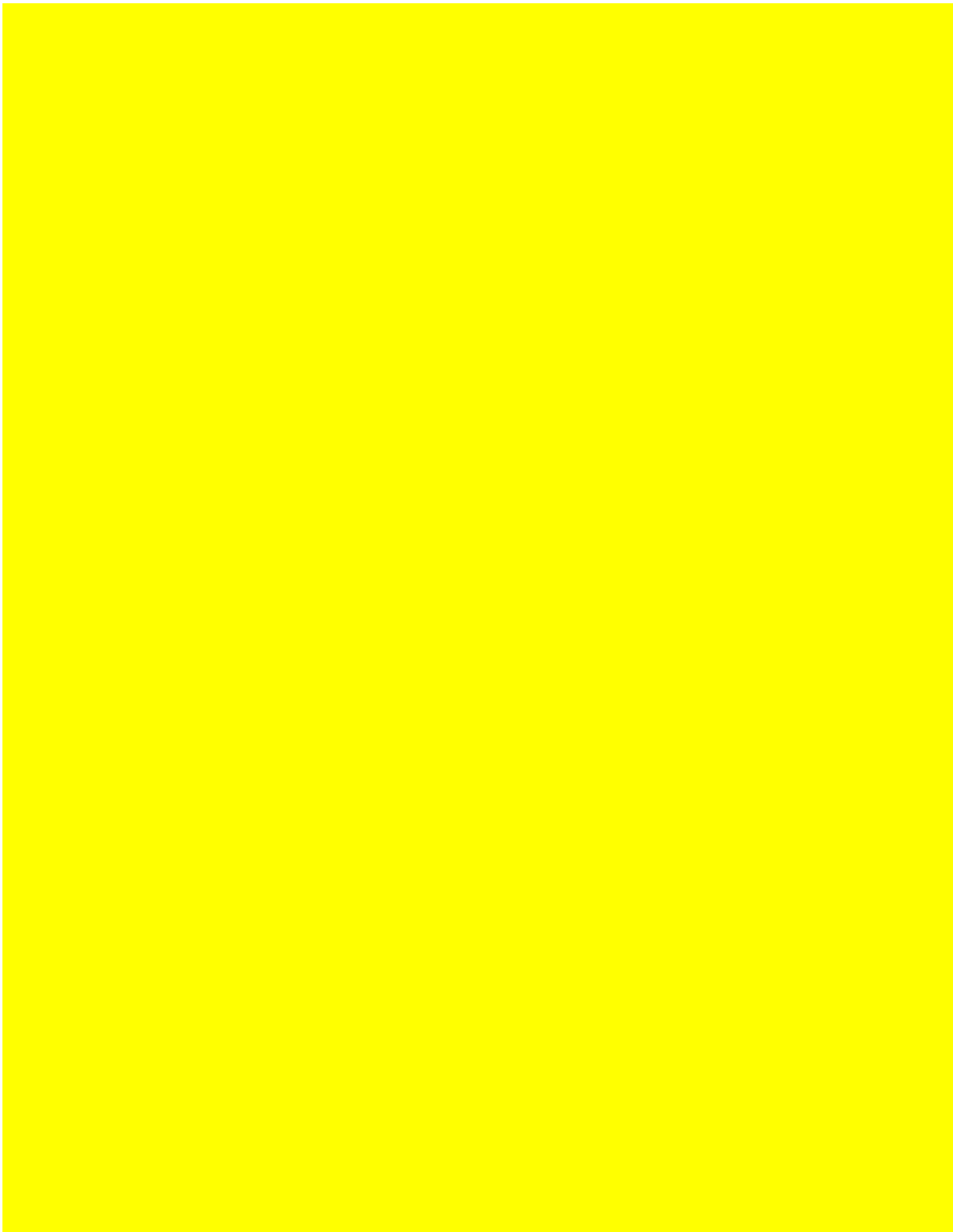
	Name of the Person (Main/alternate)	Total Experience (years)	Total length (m) driven to date in hard rock having UCS upto 250Mpa in HDD operations
Master Operator (One for each machine)			
Alternate Master Operator (One for each machine)			
Assistant Operator 1 (One for each machine)			
Assistant Operator 2 (One for each machine)			

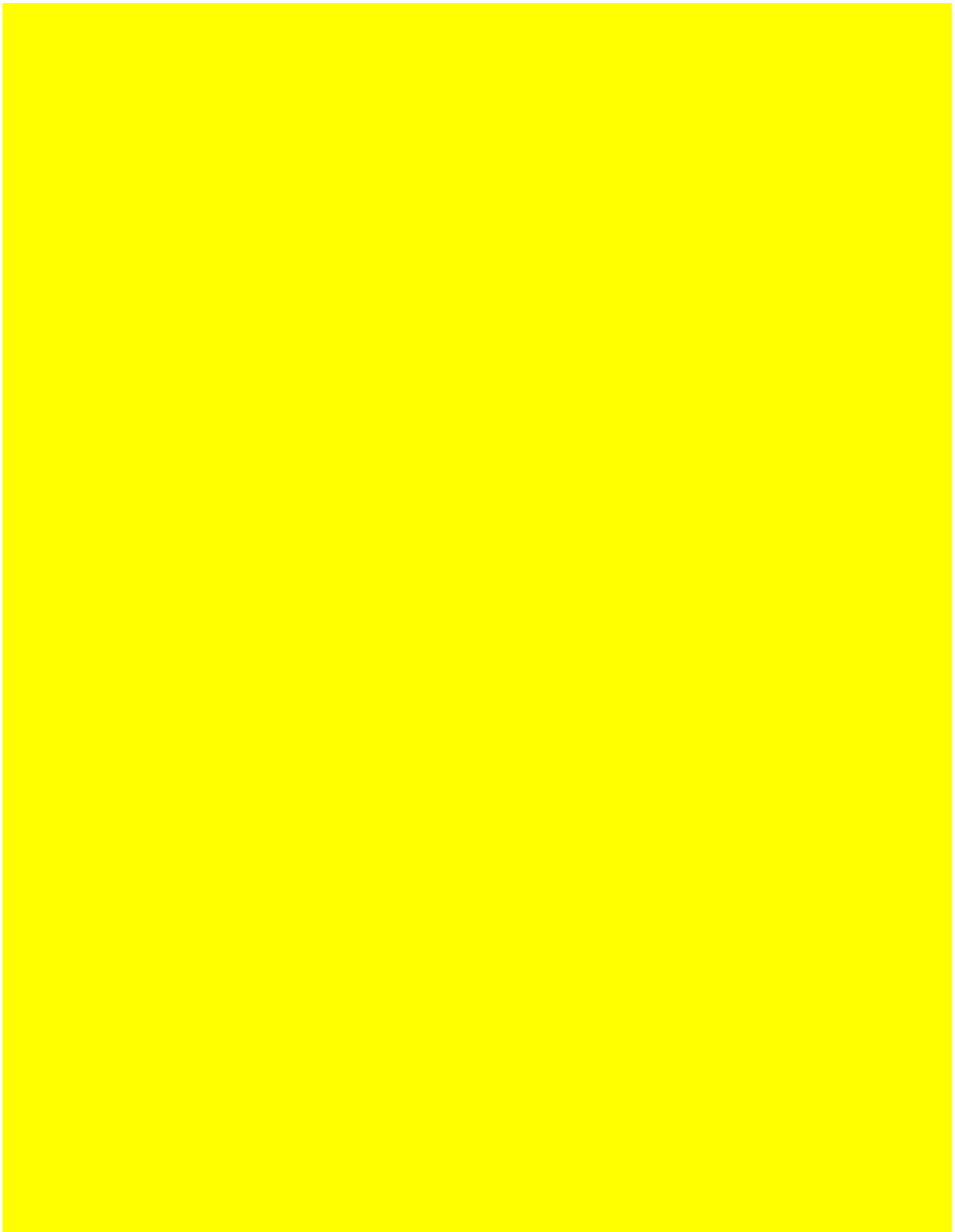
Rate of recovery in case of non-compliance of the clause be stipulated at following rates:-

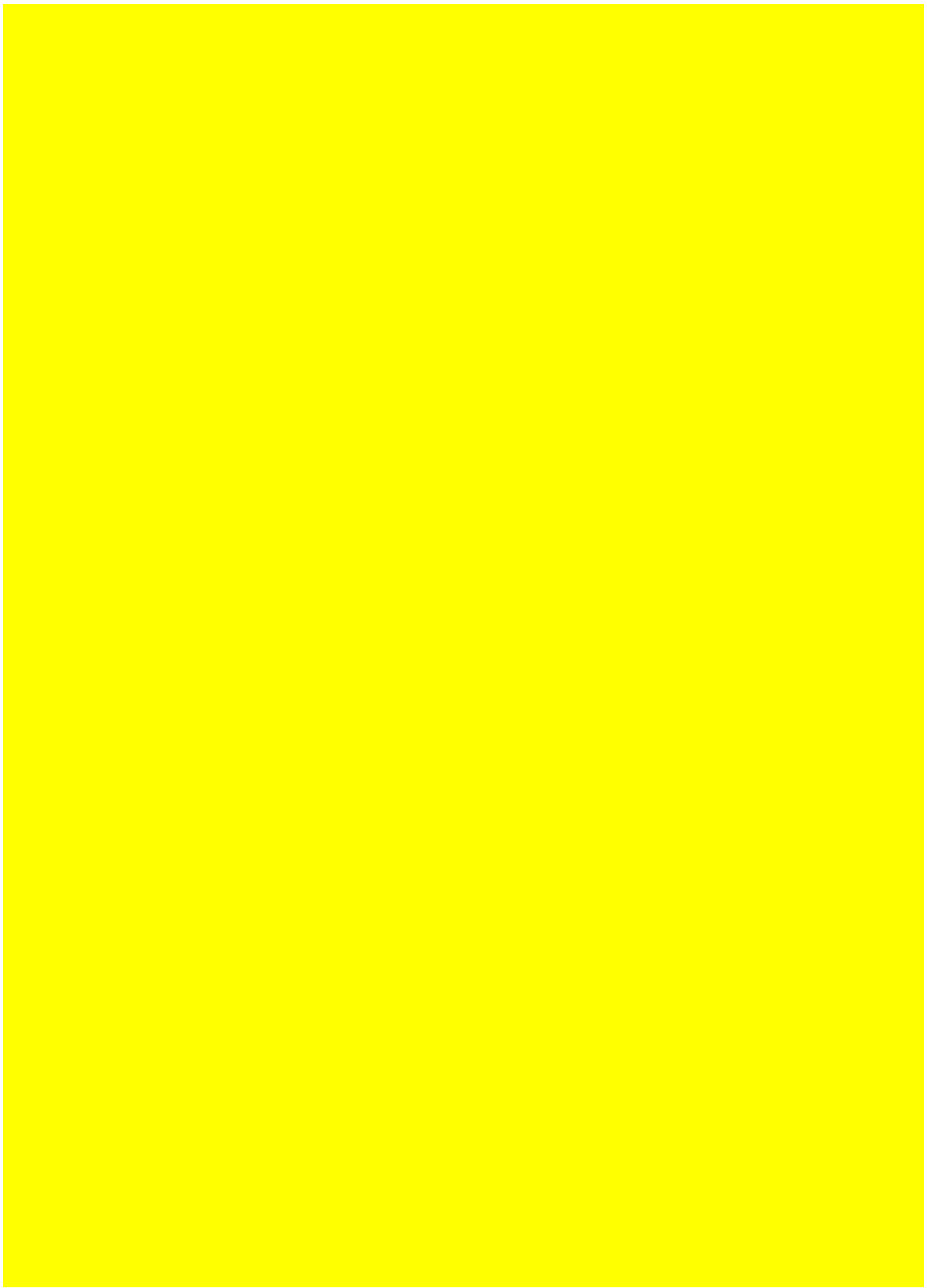
Sr. No.	Qualification	Experience (years)	Rate of Recovery
1	Project Manager with degree	10	Rs.30000/-p.m.
3	Graduate Engineer	5	Rs.25000/-p.m.
3	Graduate Engineer	2	Rs.15000/-p.m.
5	Diploma Engineer	5	Rs.15000/-p.m.

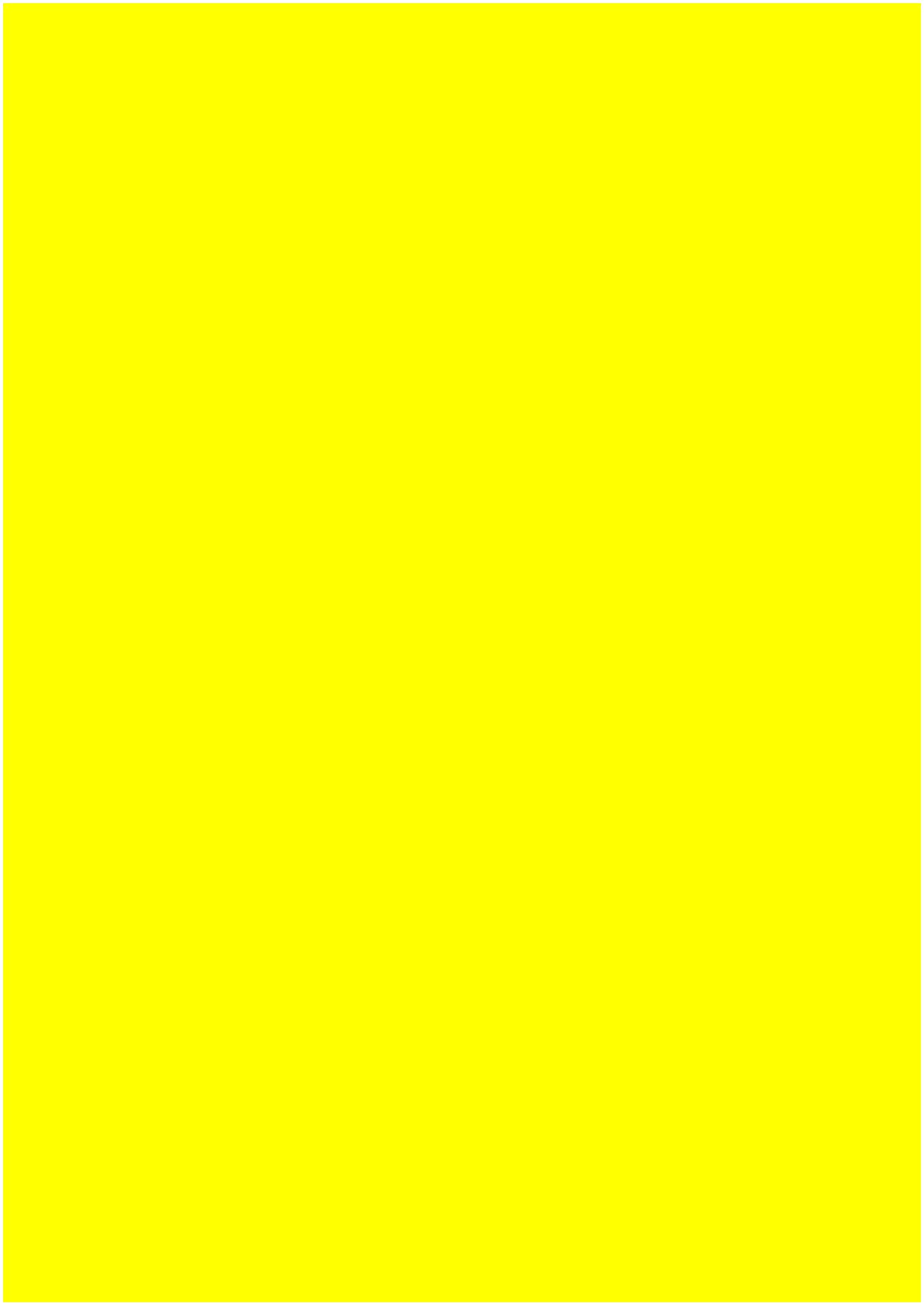
Note: Scanned self attested duly digitally signed/Attested copies of qualification certificates and details of workexperience shall be submitted and uploaded in Packet B

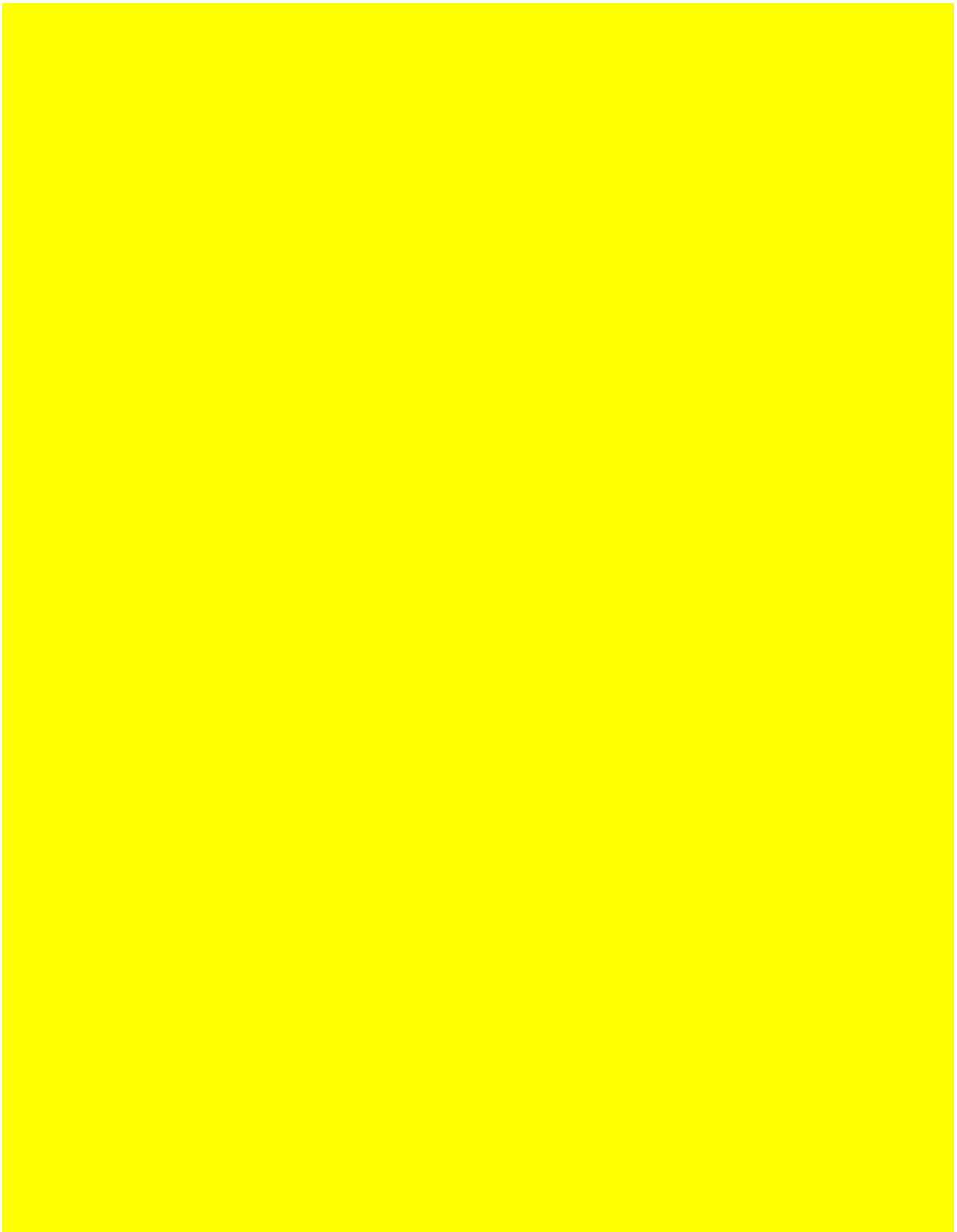


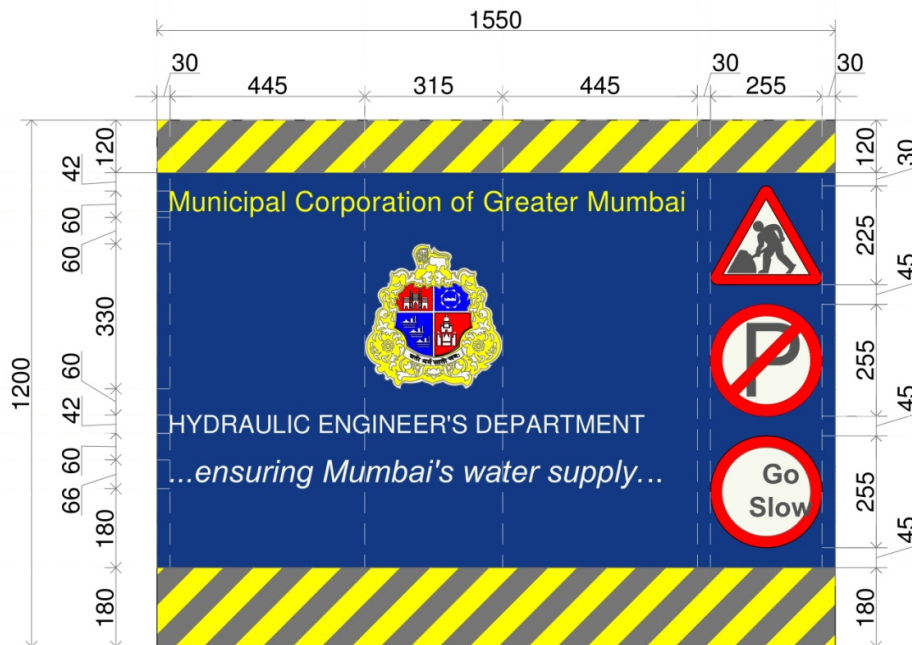
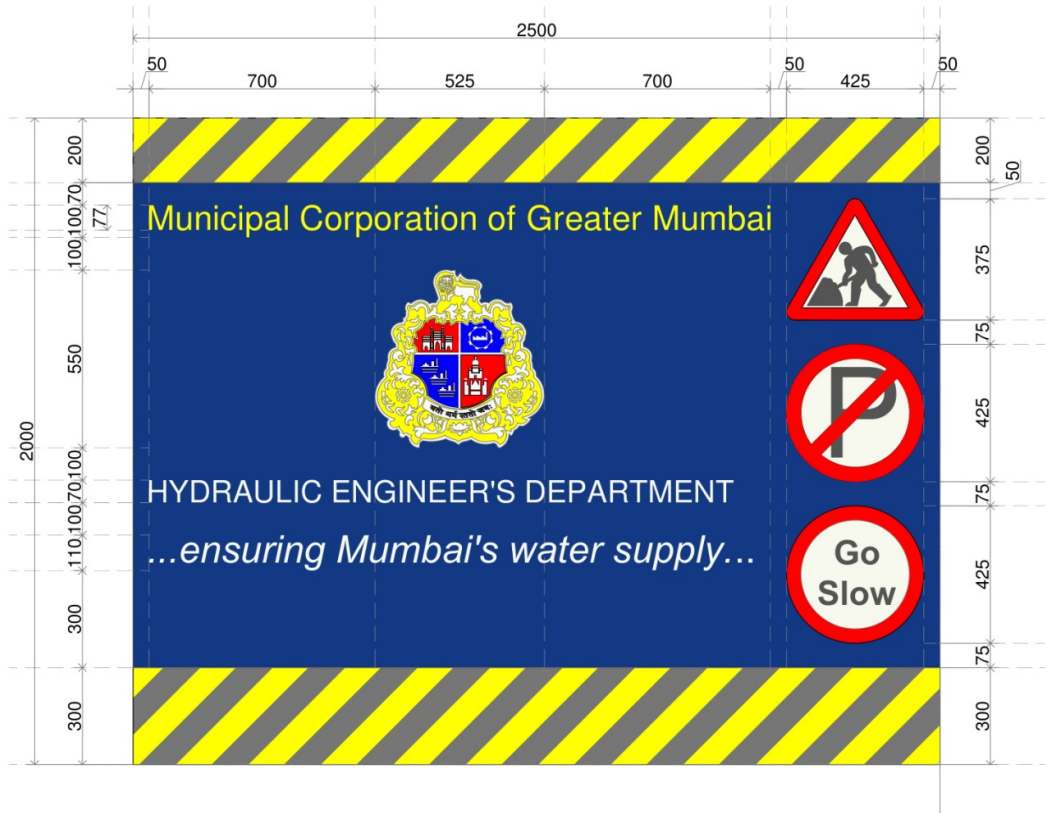


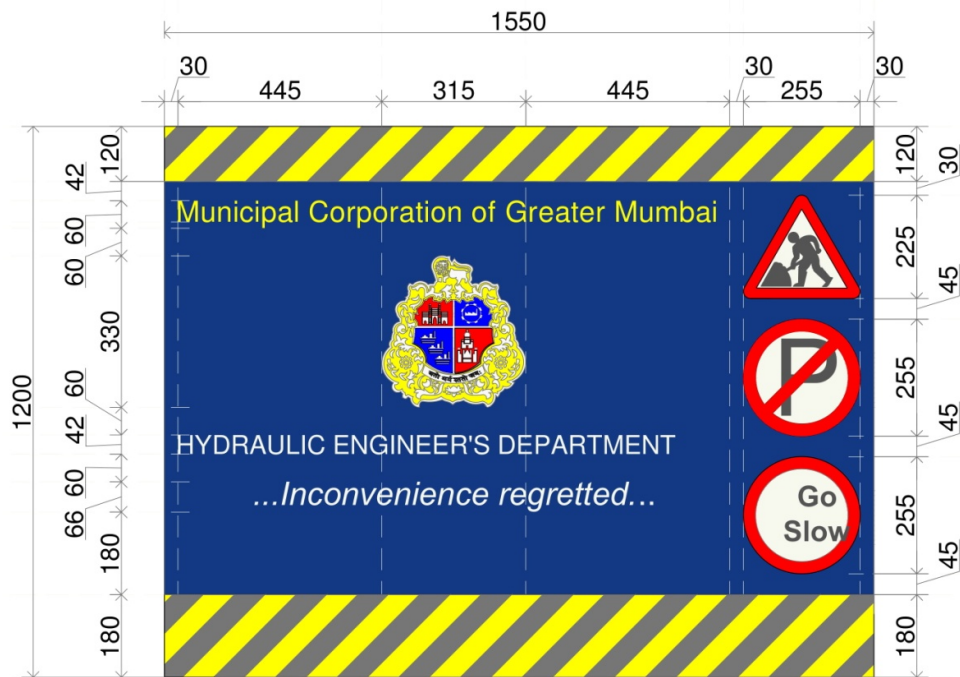
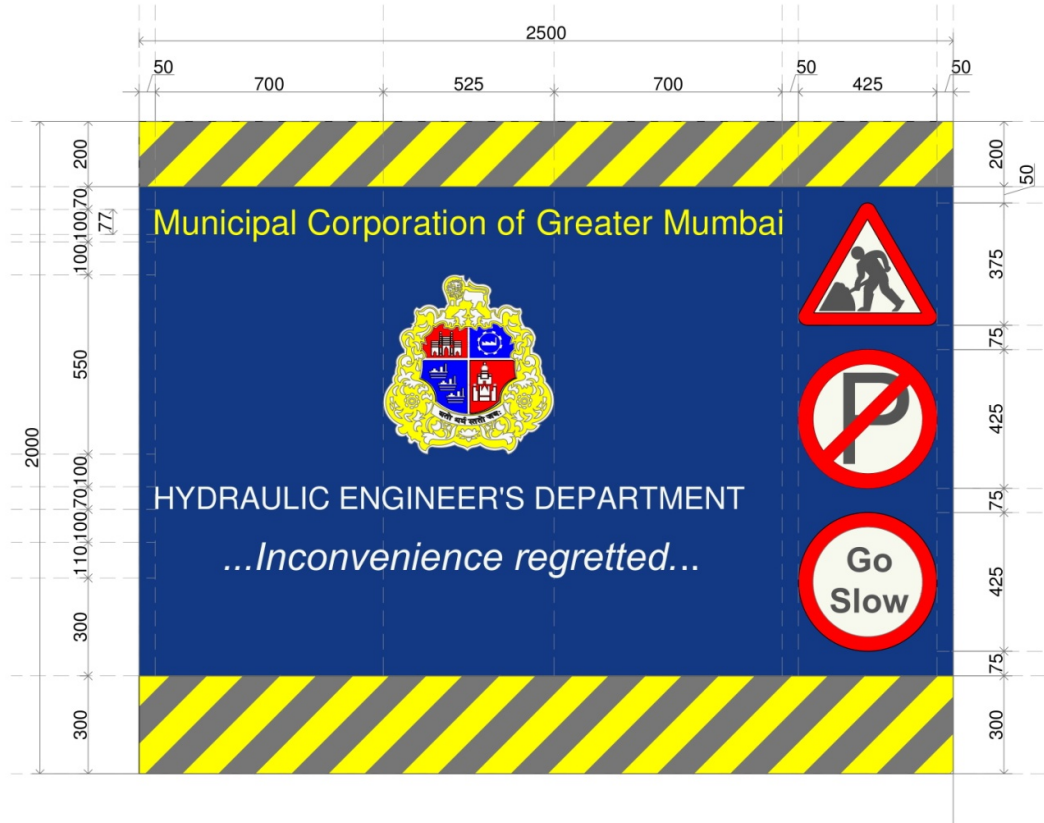


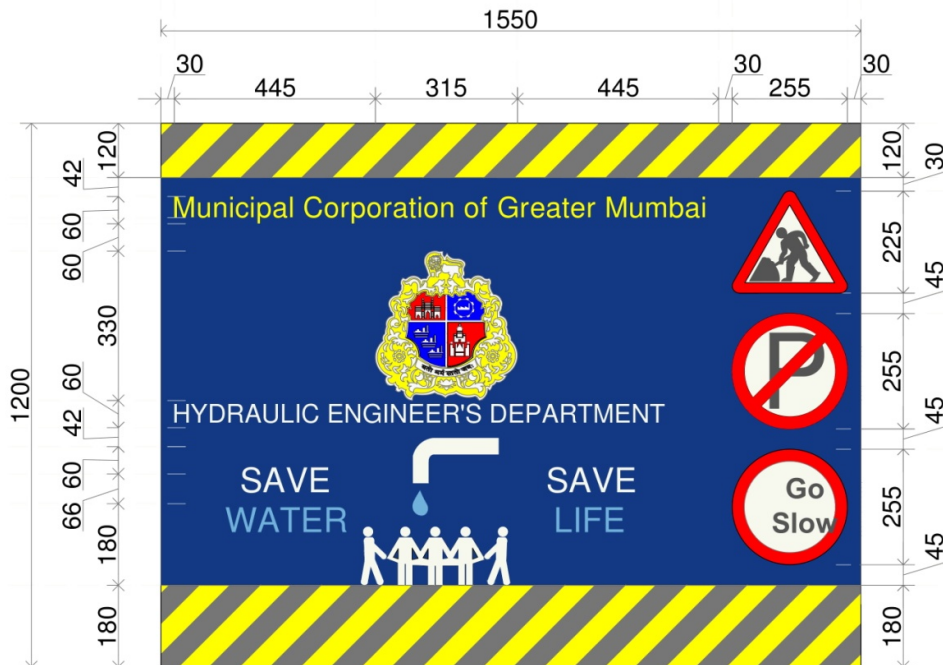
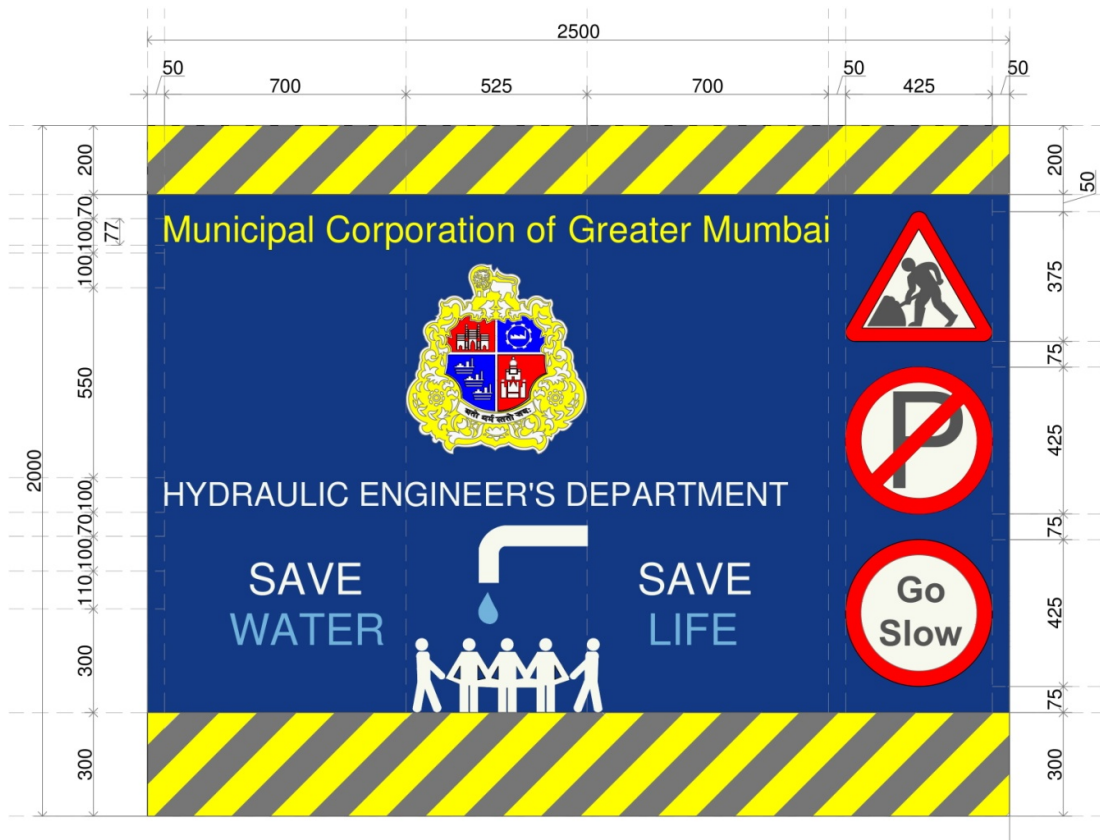


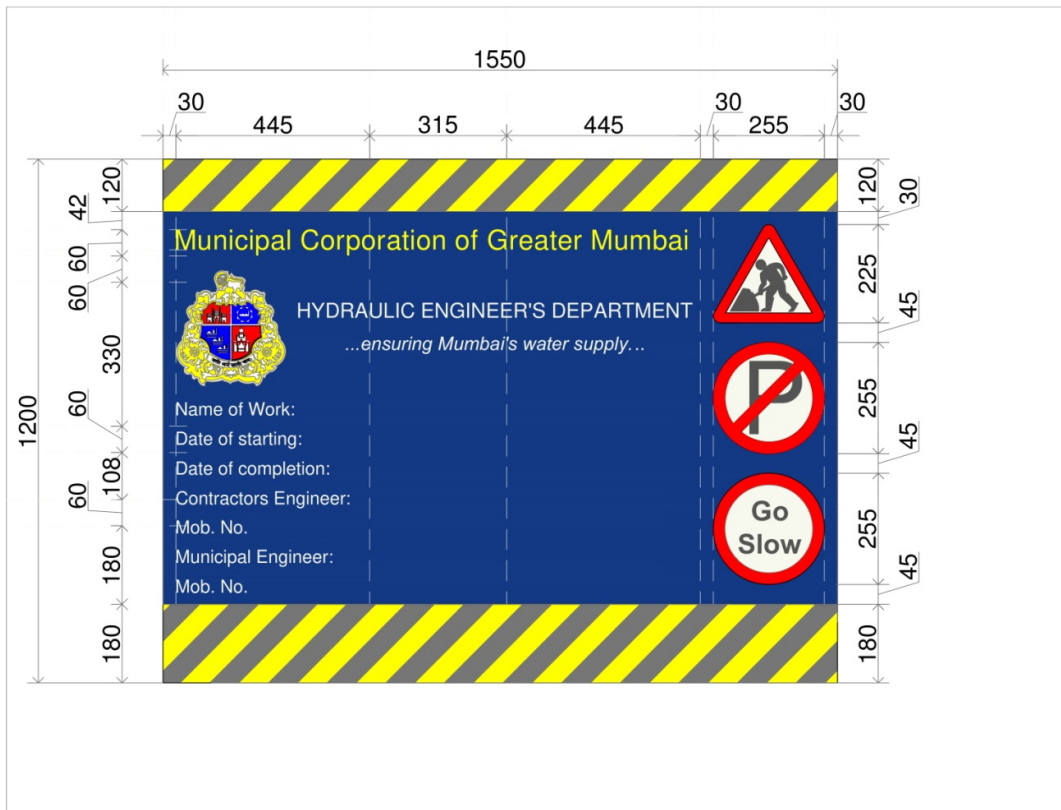
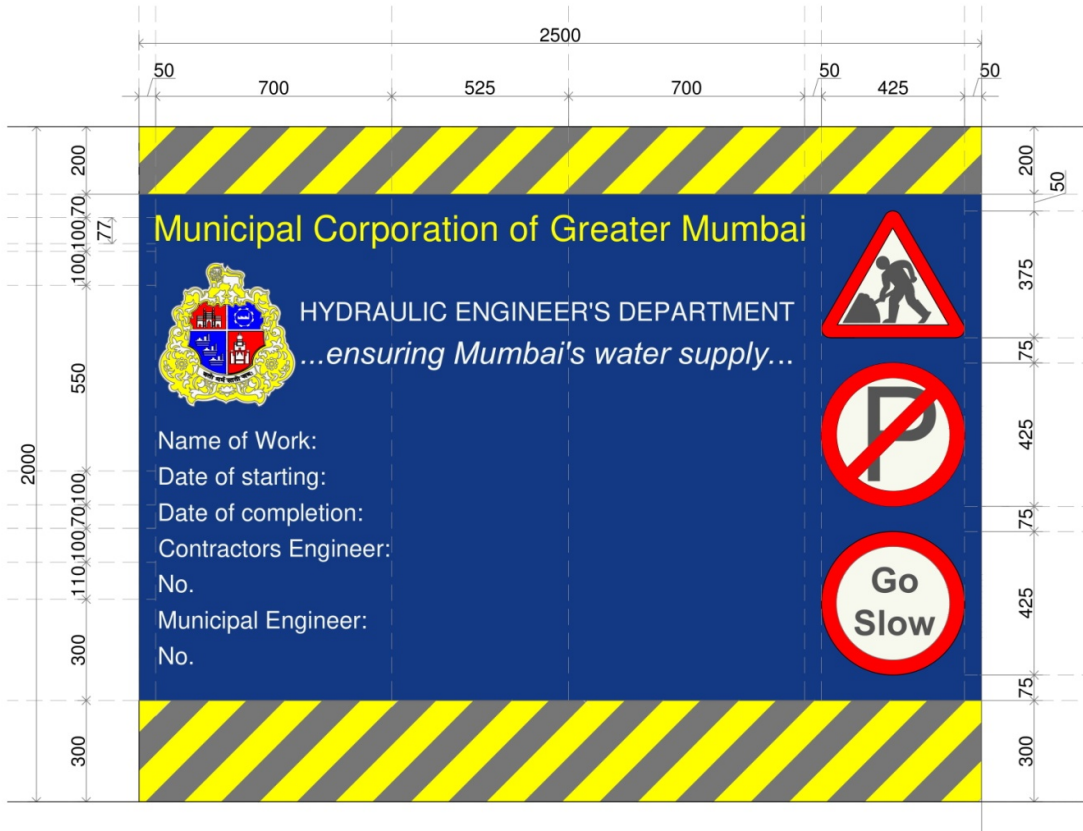








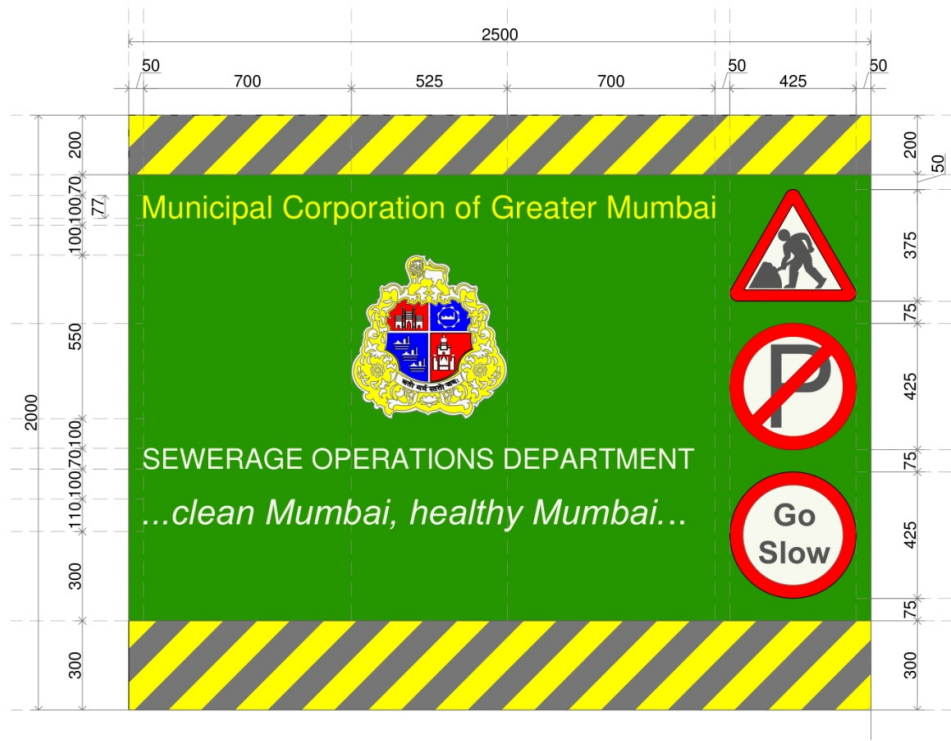


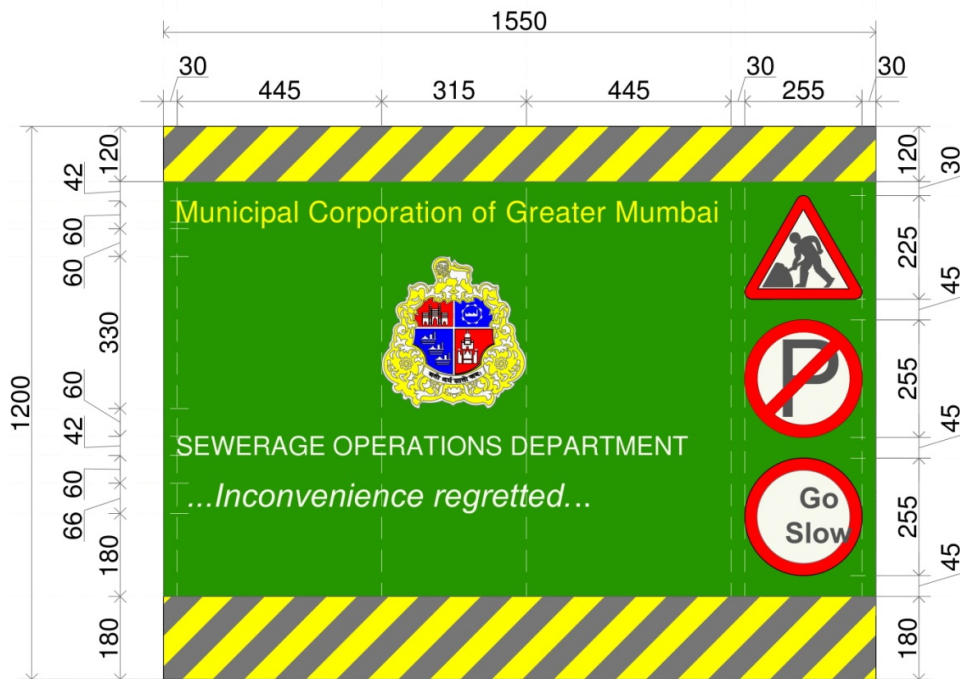


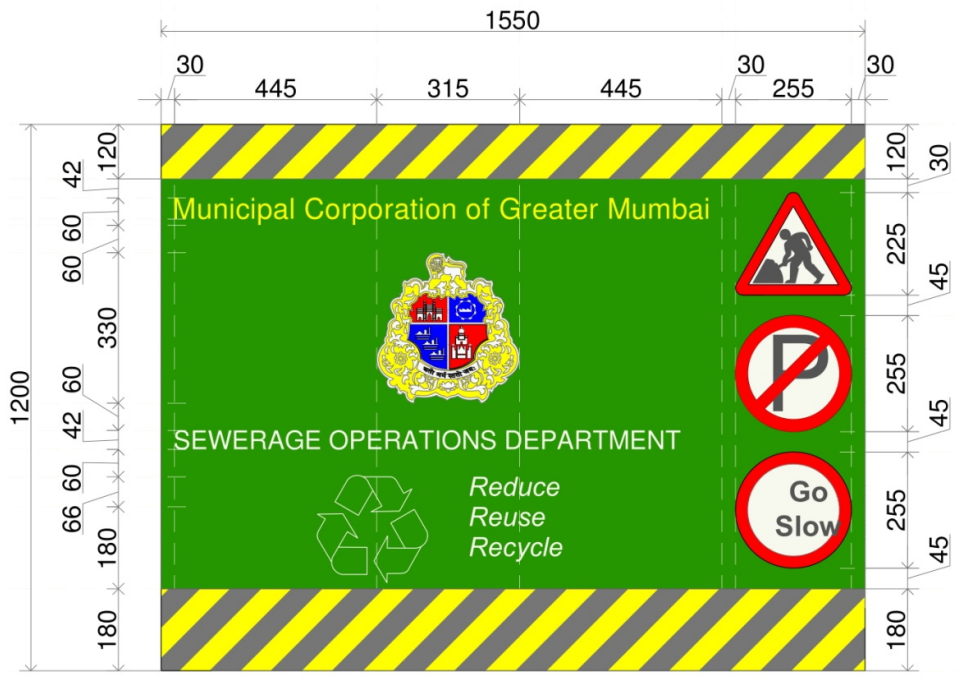




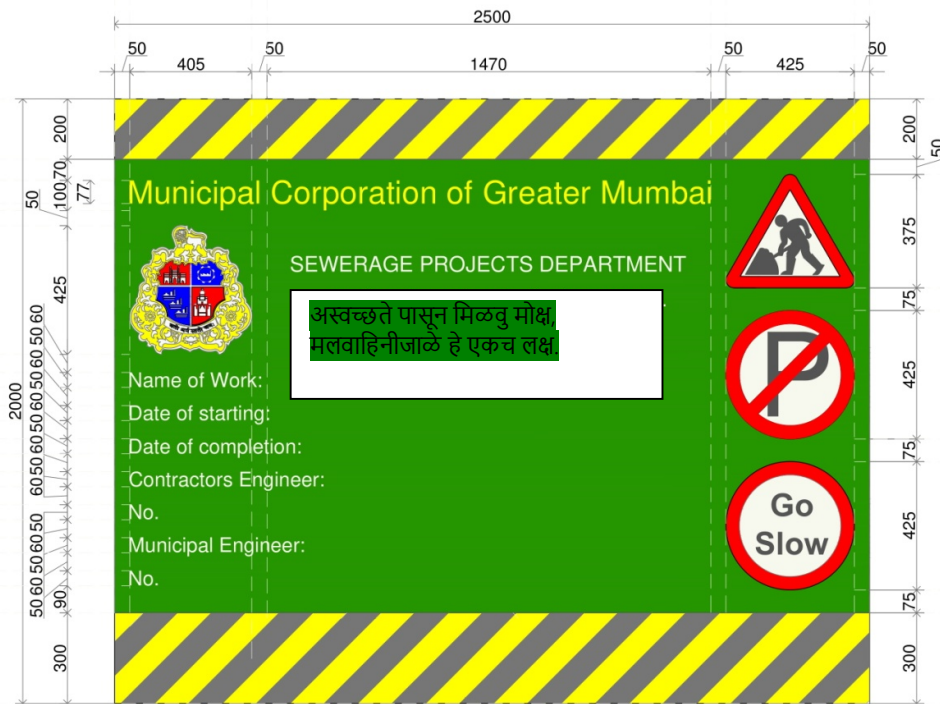




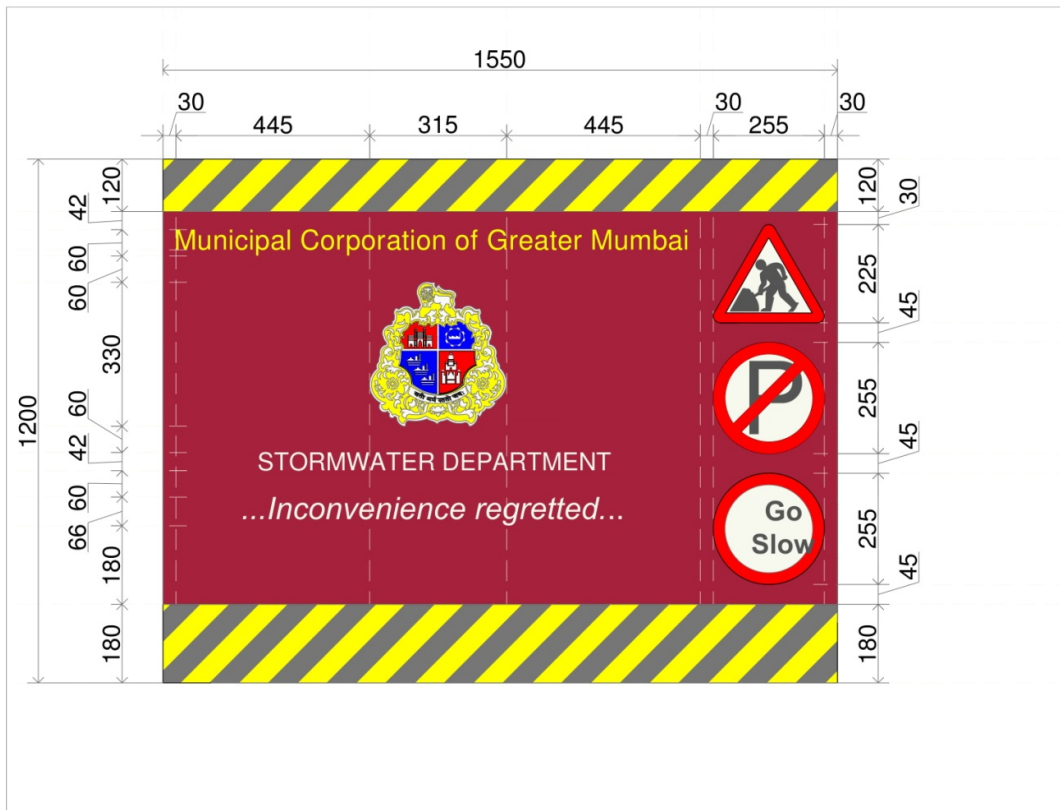


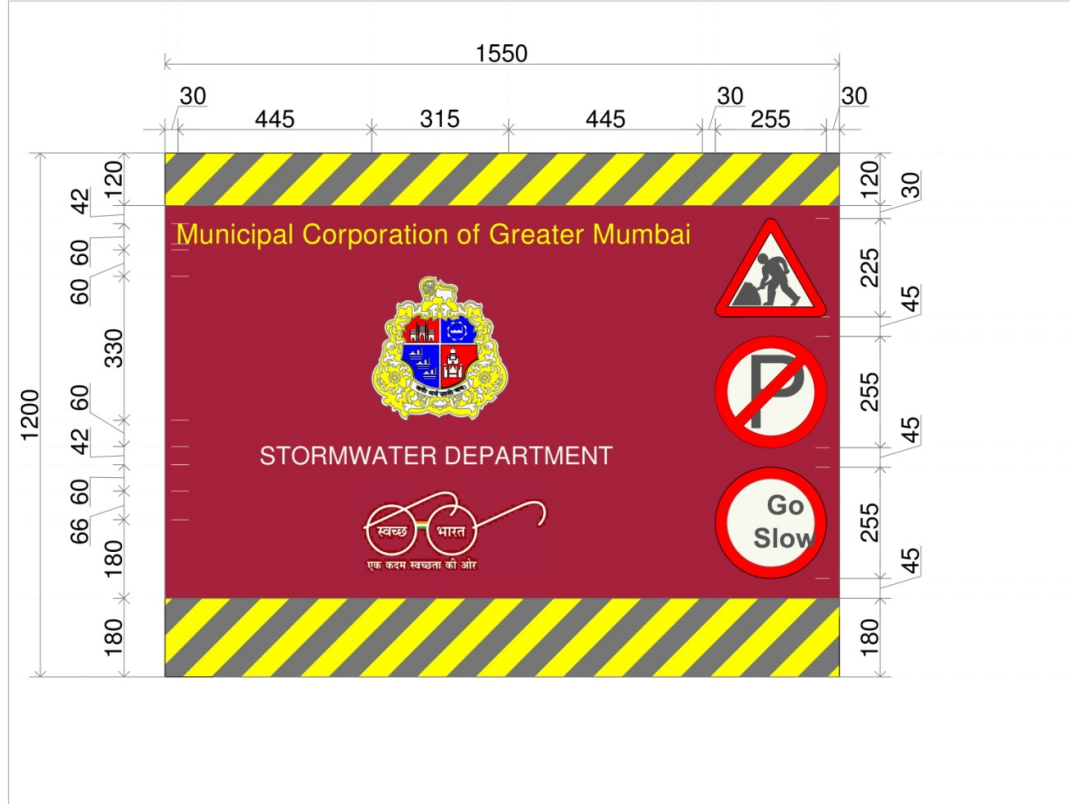












SECTION -14
SPECIAL DIRECTIONS
TO THE TENDERER

SPECIAL DIRECTIONS TO TENDERERS

- 1 This contract envisages P/L RC NP 3 Class, S.W., HDPE Pipe Sewer Line & RC NP4 Class and above of jacking standard pipe.
- 2 The contractor should note that the work is required to be carried out in phases as permitted by the Traffic Police Dept. The contractor will have to obtain permission from Traffic Police Deptt. well in advance for closing down the road or part thereof for the execution of the work. The work will have to be carried out in stages depending upon the permission granted by the Traffic Police for closure of the road or part thereof. The contractors should therefore take this into account while quoting.
 - (a) The contractor shall obtain specific permission or approval through the engineer wherever required. Only recommendatory letters will be issued by M.C.G.M. The Contractor shall be responsible for obtaining permissions from traffic police, PWD, M.M.R.D.A., Railway authorities or any other concerned authority outside M.C.G.M., with due regard to the method of work and detailed designs involved. The contractor shall be responsible for submission of the detailed designs and clarification on time to the concerned authorities. The M.C.G.M. shall arrange to pay for the way leave charges, supervision charges or any requisite charges only, as demanded by the concerned authorities.
 - (b)
 - (i) No extra payment will be made for de-watering of the existing sewer line and also while executing the proposed work.
 - (ii) All the existing street connections / cross sewer lines shall be transferred to the proposed sewer line with no extra cost.
- 3 The contractors will be given 12 mm. dia. or 20 mm. dia. (as per the conditions of H.E.) water connection for drinking purposes for each site office at the cost of contractor. In the event of non-availability of BMC water connection, the contractors shall make arrangement at his own cost. Extra water required for construction purposes will have to be brought by the contractors at his own cost and no extra claims on this behalf will be entertained.
- 4 Methodology of the work, safety manual and quality assurance plan shall be submitted before commencement of the work with copy at each site office.

5 Quantities of all items provided in the B.O.Q. may not be required to be executed depending upon the site conditions, The e - Tenderer shall not be entitled for any compensation on this account. Before starting the work, contractor shall consult with the Site Engineer and shall take actual measurements on the site for procurement of material.

6

- i. All material required for the work can be stacked near the site of work in such manner so as not to cause any inconvenience to the pedestrian and vehicular traffic. If no space is available on site then e - Tenderer shall make his own arrangement for stacking of material etc. No extra payment will be made on this account.
- ii. The surplus excavated material from the site shall be removed within 24 hours, as directed. The necessary tipping charges, as applicable, shall be borne by the contractor.
- iii. The royalty charges in respect of excavated material shall be paid by the contractors to the collector as and when asked for.
- iv. iv) The contractor should note that during the execution of the work, debris etc. dumped on the public streets/places will have to be removed immediately after completion of the work as per direction of the Engineer, failing which the same will be got removed at their risk and cost.
- v. The site shall be cleared by removal of surplus material on or before 15th of May every year.
- vi. BMC will not make any payment towards transportation/removal/disposal of excavated surplus earth from construction site. Also the due procedure in accordance with the provisions of the 'Construction and Demolition Waste Management Rules-2016-vide no. Dy.Ch.E/SWM/3957/Op dtd. 28.09.2018 shall be followed. Contractors shall quoted accordingly.

7 Concrete Works:

All concrete works shall be carried out as per item description or by Ready Mix Concrete only.

8 The contractors shall make necessary arrangement for adequate lighting during night time. No extra claims will be entertained for the same.

9 It is the responsibility of the contractor to provide healthy accommodations to all construction labours who will be deputed at subject site of work. Proper hygienic condition shall be provided by the contractor at his own cost.

- 10) In Completion of the work, the contractors shall furnish free of cost 2 sets of final completion drawings in Auto CAD/ PDF format in CD and physical copy on Reproducible Tracing Film (50 microns, both sides matt, Technova brand or similar quality,) duly signed by the Engineer to the Dy. Ch. E. (SP) P&D. within a period of two months from the date of completion of the work failing which a rebate of Rs 1,000/- (One thousand) as well as a penalty of Rs 5,000/- per drawing (Five thousand) will be recovered from the contractor. The payment of final bill shall be made to the contractors after receipt of above sets. Also, after the completion of work of sewer line shall be handed over to S.O. Department and the same shall be updated in SUMC's network in consultation with S.O. Department. In case of for which 5% amount of contract cost shall be withheld.
- 11) The work should be started from downstream and shall be handed over and commissioned in part as per the progress of the works. DLP of the part handed over sewer line will be counted from the date of handing over.
- 12) The sewer line laid shall be tested for various tests in presence of representative of S.O. department during the progress of the work. The cost of the Test shall be borne by the contractor.
- 13) List of approved Banks etc. has been attached to this document. However, M.C.G.M. reserves right to modify these lists.
- 14) The RMC/Asphalt works required to be done under the captioned contract shall be got executed with RMC/Asphalt plant registered with BMC.
- 15) All the Frame & covers required for the works to be carried out under the captioned contract shall be procured from the specified manufacturers registered with M.C.G.M. only and also the interlocking paver blocks shall have BIS registration.
- 16) Traffic Management:-
 - 16.1 The contractor shall have to provide adequate number of wardens as per requirement of Traffic Police Deptt. at the contractor's cost.

- 16.2 Traffic signs – Temporary traffic and construction signs are to be provided during construction and maintenance operations for traffic diversion and pedestrian safety as per Traffic Diversion Plan approved by the Engineer.
- 16.3 The contractor shall display the boards stating information of the name of the work, date of starting, date of completion, name of the Deptt. and contact telephone nos. of Contractor's Engineer
- 16.4 The contractor should note that the work is required to be carried out in phases as permitted by the Traffic Police Dept. The contractor will have to obtain permission from Traffic Police Deptt. well in advance for closing down the road or part thereof for the execution of the work. The work will have to be carried out in stages depending upon the permission granted by the Traffic Police for closure of the road or part thereof. The contractors should therefore take this into account while quoting:-

The contractor shall obtain specific permission or approval through the engineer wherever required. Only recommendatory letters will be issued by M.C.G.M. The Contractor shall be responsible for obtaining permissions from traffic police, PWD, M.M.R.D.A., Railway authorities or any other concerned authority outside M.C.G.M., with due regard to the method of work and detailed designs involved. The contractor shall be responsible for submission of the detailed designs and clarification on time to the concerned authorities. The M.C.G.M. shall arrange to pay for the way leave charges, supervision charges or any requisite charges only, as demanded by the concerned authorities.

- 17) While constructing/improving footpath, provision for slopping ramp of at least 1.00 m width or as directed, shall be made at every carriage entrance, junctions, bus stops etc., for convenience of physically challenged persons.
- 18) The full time services of the Personnel Team of the contractor mandatory during the entire period of the project. Daily Attendance register of Contractor's staff shall be maintained and got checked from BMC staff from time to time.
- 19) Rebate of item / items not operated shall be taken.
- 20) All trenches taken in connection with the work should be sufficiently barricaded as per circular U/No.MGC/F/6342 dated 5.5.2018 Barricading shall be provided free of cost as per Circular vide U/No.MGC/F/6342 dated 5.5.2018 and as per Annexure I, II and III of

Standard drawings and specifications with slogans and department wise colour codes.”
The copy of circular is attached to this tender as a part of tender document.at pg 244 to 250. If it is noticed during course of execution that proper barricading is not provided by the contractor then a penalty of Rs.2000/- per Meter per day will be imposed.Penalty account of lapses in providing barricades will be cumulatively imposed to the tune of 5% of the contract cost.”

- 21) Every running bill submitted by the contractor for payment shall be with the detailed measurements recorded for each item.
- 22) All the excavated materials belong to Municipal Corporation of Brihan Mumbai and therefore shall be the Property of the Municipal Corporation of Brihan Mumbai. It will be mandatory on the part of the contractor to use this material in execution of works under contract if the quality of material available is as per the specification. The contractor is at liberty to use the surplus excavated material wherever he likes on the work even beyond this contract or dump it at dumping ground if the contractor so desires without charging any rate for cost of material. For this purpose, the contractor shall have to sort out the material in separate stacks and transport the same at his cost. No transportation charges or any other charges will be paid to the contractors.
- 23) The noise level shall be maintained within the permissible limit in Silence zone area during the construction activities by the Contractors, as per the notification dated 14.2.2000, issued by the Ministry of Environment & Forests.
- 24) The Mix Design for Concrete shall invariably include details of source material including tests carried out at source (Quarry/Cement Manufacturer's lab).
- 25)
 - i) All the specifications laid down by IRC and as detailed in the relevant clauses of MoRTH- (2001) Manual on Specifications for Road and Bridge Works in respect of Construction of Drainage Layer, Wet Mix Macadam, Dry Lean Concrete should be strictly followed.
 - ii) All the works for thin/ ultra-thin white topping shall be carried out as per IRC – SP - 76.
- 26) It will be the responsibility of the contractors to arrange for a joint inspection in every quarter of the year after completion of the work till the expiry of defect liability period

and also 4 weeks before expiry of the defect liability period. Further, if the contractor fails to do so, the observations made by the staff during site inspection will be considered for the purpose of noting the defects.

27)

- (i) All the works shall be started from existing Robohole at the downstream end of the proposed work so that the line laid will be put to use immediately.
- (ii) All the existing street connections / cross sewer lines shall be transferred to the proposed sewer line with no extra cost, if any.
- (iii) The work may involve laying of upsized sewer on narrow Gaothan street having existing utility such as SWD, Sewers, Water mains. At some location, proposed sewer work will be required to be carried out by dismantling existing cross drain (S.W.D) and redo the same. It is likely that the new sewer will be laid on existing sewer alignment by isolating the same. The bidder has to desilt the existing sewer drain wherever required at their own cost. No extra dewatering charges in excess of BOQ quantity will be paid.
- (iv) Before redoing of culvert work, the design of R.C.C. / Structural work shall be obtained from a licensed Structural Engineer at the cost of the tenderer.

28) The Contractors may be called upon to execute additional work of laying small portions of sewers in the vicinity of the present work under the proposed Contract. This fact should be taken into consideration while quoting the percentages or rates for the tender of the work.

29) The contractor which expression shall include any person or group of persons representing the contractor who are required to handle iron and steel materials shall register themselves as employer with the Mumbai Iron and Steel Labour Board and shall completely fulfil all the obligatory provisions of the Maharashtra Mathadi, Hamal and other Manual Workers (Regulation of employment and Welfare) Act 1969, and the Mumbai Iron and Steel Unprotected Workers (Regulation of employment and Welfare) Scheme 1970. The consequences of failure of compliance of any of these provisions will entirely be the liability and responsibility of the Contractors.

30) Any amount of Dewatering required for crossing nallah / culvert / S. W. drains, crossing of sewer lines, seepage of ground water from adjoining area to the Jacking / Receiving pit and to the intermediate Robohole pit and leakage through utilities etc. and also for

making connection of the proposed sewer lines to the existing sewer line in surcharge conditions / to get connected to pumping station should be done free of cost. No payment will be made for dewatering, desilting, desludging. Contractor shall note the same and quote accordingly.

The item of the constructing body Robohole over functioning / nonfunctioning sewer of any diameter will be paid in regular Robohole item which includes the cost of breaking of concrete and pipe, desilting of sewer line, dewatering of sewer line, etc. The contractor should quote their rates accordingly.

- 31) The contractors will have to make connections to the existing Robohole including plugging, diverting or pumping the existing flow or accumulated water, making holes of any size in the masonry, breaking the existing cement concrete haunches, making sand plaster, constructing new channels and haunches with M 150. C. C. finished smooth with 20 mm. (3/4") thick cement mortar 1:1, deplugging and desilting the Robohole on upstream side and downstream including passing disc in the length complete as directed (for this item no payment will be given to the contractors).
- 32) Tenderers should note that if the site of work is the filled up creek close to the sea, it is likely that abnormal quantity of water will be required to be pumped out from the trenches during the course of execution. No extra payments for excessive pumping shall be separately made on this account. The tenderers should therefore quote their rates accordingly, at the time of filling the tenders.
- 33) Tenderer should note that if any deposits are required to be paid to Government Agency/Authorities etc, for obtaining any permission from them, an amount equivalent to the said deposit shall be withheld from the contractors bill, till the contractors fulfill all the conditions laid down by Government Agency/Authorities and obtain certificate to that effect from them and the tenderers shall take cognizance of the same, before quoting for the tender.
- 34) On receipt of the work order, an amount equivalent to 1/2% (half percent) of contract cost or Rs10,000/-, whichever is less, shall have to be deposited on demand by Ward Office where the work site is situated, towards deposit for removal of debris from the site. This amount will be adjusted towards the debris which has not been removed from the site by the contractors in time and removed by the Ward Staff.

- 35) a. The successful bidder are liable to pay cess to the Government as per the notification issued by Industry, Energy and labour department is applicable from time to time and challan of amount remitted shall be submitted to the department.
- b. If applicable, the tenderer are directed to submit the scanned copy of the certificates of registration under E.P.F. & M.P. Act 1952 and E.S.I.C. Act 1948.
- 36) Where the excavation is required to be done across the road or along the part of a road where there is high volume of traffic, the Engineer may direct the contractor, to execute the work in more than one shift, so as to complete the work, in least required time, so as to reduce the inconvenience caused to the free flow of traffic. Arrangement will have to be made by the contractor to provide additional lights, sign boards etc. as required by the Engineer and traffic police. The contractor will have to provide M.S. plates of sufficient thickness, including stiffer plates for strengthening with supporting joints, if required, to cover the open trenches during the day time for smooth flow of traffic during the progress of the work and till the trench is backfilled. No extra payment will be made for this arrangement. The program of the work to be done in additional shifts shall be submitted to the Engineer and got approved before starting the work, so that the work can be completed in a time bound manner.
- 37) It should be clearly understood that for the purpose of determination of the contract period, the monsoon period will be taken only as from 10th June to 30th September, and all works shall be recommenced on 1st of October, irrespective of whether there are intervening festivals and/or rains etc.
- 39) No material will be supplied by M.C.G.M. Stores.
- 40) The percent above or below quoted in this schedule shall hold good for all works done under this contract without reference to location of works or quantities.
- 41) The contractors are particularly directed to observe from the specifications what is to be included in the rates for the several portions of the works and frame all their per cent above or below accordingly.
- 42) Detailed specifications are available on M.C.G.M. and plans, contract forms, etc. will be available for inspection during office time in the Office of Dy.Chief Engineer (SP) P&D

Office, 2nd floor, Engineering Hub Building, Dr. E. Mosses Road, Worli, Mumbai- 400 018.

- 43) The tenderers should furnish list of plants and equipments in their possession and which they intend to bring on site for the particular work.
- 44) Time is the essence of the contract.
- 45) The whole work shall be finished in a workmanship like manner as per specification and to the entire satisfaction of the Municipal Commissioner.
- 46) It is incumbent on the Contractors to remove all “Pardis” put up by them during the progress of sewer work so as to obviate the necessity of such removal after the sewer is put into commission while handing over charge of such sewers to the respective Department. If any such “Pardi” is found after the Sewer is put into commission the cost of breaking and removing the same will be recovered from the Contractors.
- 47) The tenderer should visit the site of work before quoting their percentage above or below. It should be noted that even though the work sites are approachable there is no regular means of access to the work sites. The tenderers will have to make necessary access up the work sites for transporting material and machinery at their own cost. No extra payment will be entertained on this account.
- 48) If the part of the excavation is to be done in the creek area and some portion is to be done in existing natural water courses the tenderer should note that no extra payment will be paid for diverting the flow whenever and wherever necessary and/or for the excavation in marshy land.
- 49) After completing the work, the whole of the work should be handed over to E.E.(Mech) M.S. of the respective zone i.e user S.O. department for maintenance. A copy of the memo acknowledging the taking over of the work should be handed over to the Ex-Engineer in charge of the work and a copy of the same along with the completion plan shall be sent to the Dy. Chief Engineer (S.P.) Planning & Design.

- 50) In respect of Filling in trenches with Municipal earth materials etc. in layers not exceeding 25cm. in loose thickness, watering etc. compacting by means of plate vibrator or a power roller to a depth not exceeding 2m. etc. complete as per New Road Specifications / trench guidelines effective from 01.02.2015 and as amended from time to time.
- 51) The tenderer should note that the sewer connections are to be made to the existing Roboholes which may be in surcharge condition and no extra claim of any sort will be entertained for plugging, desilting, diverting the flow or pumping out water from the existing sewer line as well as from the trench, to any extent, and contractors should quote their rates accordingly.
- 52) Permission for laying/ replacement of utilities, pipe line works, cables shall be granted only during fair season starting from 1st October till 15th April. The backfilling of the trench shall be completed upto 30th April so that reinstatement of trenches including asphaltting work can be completed prior to 10th May (MDB/4259 of 14.3.2005 & Ch.E/4754/Rds of 29.9.2005). The cost of the same shall be borne by the contractor.
- 53) Scope of Work includes minor changes in alignment due to site difficulties, if arises. Contractors are liable to carry out the sewer work as instructed by the Engineer of Contract.
- 54) BMC reserves the rights to reduce the scope of the work during the execution of the work for any reason. For the reduction in the scope of the work no claims whatsoever of nature by the contractor will be entertained.
- 55) The payment by E.C.S. will be made in the Contractors or suppliers accounts in their respective branch of the bank, if there are changes, the Contractors shall have liberty to inform the necessary changes so far as Account Nos. and name of the bank are concerned.
- 56) Contractors are directed to take out necessary Insurance Policy/policies so as to provide adequate insurance cover for execution of the work from the Directorate of Insurance, Maharashtra State only. Insurance policy/policies taken out from any other source shall not be accepted. However, if in any case the necessary insurance cover required for the

work is not offered by the Directorate of Insurance Maharashtra State then that cover shall be taken out from the Insurance Company/Companies approved by the Maharashtra State Government.

- 57) “The tenderers should bear in mind that their request of allotment of vacant Municipal plot, or their request to continue with the municipal plot already allotted for any other contractual work will not be weighed in their favour. Whenever, there will be necessity of having a suitable space/vacant plot for discharge of contractual obligations, the successful tenderers will be directed to furnish details of their own space/plot in their possession, while submitting the tenders if such plot/plots/vacant portion of a plot happen to be Municipal plot/plots/portions of plot, no guarantee that they will continue, can be assured”.
- 58) Tenderer should specifically state and upload their residential address besides their official addresses, along with the telephone, mobile and fax no. The successful Tenderer will have to establish office in Greater Mumbai with telephone and fax facility within 15 days from issue of work order. The contractor or their partners or authorized representative shall be available on the given telephone number. The said local office telephone & fax no’s shall be communicated to BMC Engineer-in-charge. Any communication sent on the said Fax/Email/Telephone no. shall be considered sufficient communication to the contractor.
- 59) Tenderer should upload & submit any additional information required to fulfil the requirements of the Instructions to the Bidders, if applicable.
- (1) Quality procedure manual
 - (2) Construction Safety manual
- 60) In any case in which under any clause or clauses of this contract the contractor shall have rendered himself liable to pay compensation amounting to the whole of his security deposit (whether paid as one sum or deducted by instalments) or in the case of abandonment of the work owing to serious illness or death of the contractor or any other cause, the Dy.Ch.E.(Roads & Tr.) on behalf of the Brihan Mumbai Mahanagarpalika shall have power to adopt any of the following courses, as he may deem best suited to the interest of the Corporation:-
- (a) To rescind the contract (of which rescission notice in writing to the contractor under the hand of the Ch.E. (Roads & Tr.) shall be conclusive evidence), and in that case the

security deposit of the contractor shall stand forfeited and be absolutely at the disposal of the Corporation.

- (b) To employ labour paid by the Municipal Corporation and to supply materials to carry out the work or any part of the work, debiting the contractor with the cost of the labour and the price of the materials (as to correctness of which cost and price the certificate of the Dy.Ch.E.(Roads & Tr.) shall be final and conclusive against the contractor) and crediting him that the value of the work done, in all respects in the same manner and at the rates as if it had been carried out by the contractor under the terms of his contract, and in that case the certificate of the Executive Engineer as to the value of the work done shall be final and conclusive against the contractors.
- (c) To order that the work of the contractor be measured up and to take such part thereof, as shall be unexecuted out of his hands, and to give it to another contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, If the whole work had been executed by him as to the amount of which excess expenses the certificate in writing of the Dy.Ch.E.(Roads & Tr.) shall be final and conclusive shall be borne and paid by the original contractor and shall be deducted from any more money, due to him by Corporation under the contract or otherwise or from his security deposit or the proceeds of sale thereof, or a sufficient part thereof.
- (d) In the event of any of the above courses, being adopted by the Dy.Ch.E.(Roads & Tr.), the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased, or procured any materials, or entered into any engagements, or made any advances on account of or with a view to the execution, of the work or the performances of the contract. And in case the contract shall be rescinded under the provision aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work actually performed by him under this contract unless and until the Dy.Ch.E.(Roads & Tr.) shall have certified in writing the performance of such work and the amount payable to him in respect hereof and shall only be entitled to be paid the amount so certified.
61. Due to nearness of water main etc. blasting will not be permitted. Hence excavation in rock will have to be carried out by any other suitable means acceptable to the engineer. Nothing extra shall be paid on this account. The tenderers should take cognizance of the same and quote their rates accordingly.

62. During progress of work, the successful tenderer/contractor shall get identified the soil/rock strata from Dy.Ch.E.(SP.) P&D. Further, the contractor will also take sample of soil/rock strata, in presence of site-In-charge, at every 30 mtr. centre to centre distance or less as per site condition and as directed by Site-In-charge and send it for testing to Govt. recognized Laboratory viz. I.I.T. Mumbai/ V.J.T.I./ S.P.C.E. Andheri(W) at his risk and cost to ascertain the crushing strength of the sample. The test results of the same shall be furnished to the office of the Chief Engineer (SP) and the quantities of the item such as excavation in the strata like soft rock, hard rock and relevant items like shoring, leaving wood work in sewer line etc. will be paid accordingly. However, if engineer incharge/Chief Engineer (SP) feels to carryout testing on additional samples same shall be carried out at no extra cost to BMC
63. The tenderer should note that conditional Bank Guarantee in the format other than that approved/prescribed by the Municipal administration cannot be accepted. The prescribed format of Bank Guarantee is available in CA's office, cash counter, Municipal Head Office for sale.
64. In respect of road reinstatement work, rate sampling of asphalt mix, penalty for failure of samples, the specifications and procedure etc. as followed by Ch. E. (SP) and prevailing at the time of invitation of tender shall apply.
65. The rate of excavation, HDD items includes pumping out any quantity of water by using any number of pumps and for any length of time singly or in combination. Nothing extra will be paid on this account under any circumstance during the execution of the whole work.
66. BMC will not make any payment towards transportation / removal / disposal of excavated surplus earth from construction site to either Municipal dumping ground (if available) or contractors own dumping facility . Contractors shall quote accordingly
67. Compressive strength of concrete mix M.100, M-150, M-200, M-250, etc. should be read as M-10, M-15, M-20, M-25 etc. & its units should be read as N/ mm². instead of Kg / Sq.cm

68. If the proposed sewer line crosses the untrained nalla, the position of Roboholes on either side of nalla will be finalized after ascertaining the location of proposed nalla walls from S.W.D. Department.
69. The tenderer should register themselves with the Municipal Corporation of Greater Mumbai with the details as per the standard form "Vender Master Creation Form" after paying necessary registration fees of Rs.5000/-.The blank "Vender Master Creation Forms" are available with Account Officer, (F.A.R.) situated at 3rd floor, Annex Building, Mahapalika Marg, Fort, Mumbai- 400 001.
70. For whatsoever reason if there is any reduction in the scope of work, the Contractors are not entitled to claim any compensation / shall not be paid any compensation.
71. Mode of measurement for HDD / microtunneling items :-
The tunnelling items will be in running meters, measured between inner faces of consecutive Jacking and receiving pits. Deductions shall be made in length of microtunnelling drive for inner diameter of intermediate Roboholes i.e. other than Roboholes constructed in Jacking and Receiving pits.
72. The mode of measurement for sewer pipe will be in running meters, measured between inner faces of two consecutive Roboholes.
73. Volume of sewer pipe (considering OD) which laid by HDD and pipe jacking method, will be deducted from intermediate Robohole pit excavation quantity.
74. No extra or additional payment will be made to the contractors for support arrangement to protect the pit walls other than items included in the BOQ, such as shotcrete etc.
75. No extra or additional payment will be made to the contractors for backfilling and reinstatement of the pits (Jacking, Receiving and pits excavated for Roboholes etc.) which will be required to be closed before upcoming monsoon and for re-opening of the same pits after monsoon. The contractors shall programme/plan the work accordingly.

- 76 The surplus excavated material from the site (i.e. material excavated from microtunnelling boring (muck) / manual boring / HDD /material excavated from all pits and/or any extra excavation required for diversion of utilities encountered during excavation of the pits etc.) shall be removed and disposed off at any lead within 24 hours as directed by engineer in charge. For which no extra or additional payment shall be made to the contractor.
- 77) The successful tenderer should provide sufficient number of security guards on site for 24 x 7 till the completion of work. For which no extra or additional payment shall be made to the contractor .
- 78) The necessary carrier pipe support arrangement in sleeve pipe by using cement mortar grouting or any other method as approved by engineer in charge shall be made by contractor for which no extra or additional payment shall be made.
- 79) The contractor should make arrangement for safeguarding / filling the cavities which may occur at the time of execution of work and Soil stabilization work wherever necessary. For which no extra or additional payment shall be made.
- 80) The necessary safety measures such as barricades all around excavated pits, blinkers, reflectors, safety nets, etc. as approved by engineer in charge shall be made by contractor for which no extra or additional payment shall be made.
- 81) Certificate from the M.C.G.M approved sewer pipe manufacturer stating the details of manufacturer, casting yard of sewer pipes of required diameter and timely supply of sewer pipes in adequate quantity shall be uploaded.
- 82) The tender should note that the sewer connections are to be made to the existing Roboholes which may be in surcharge condition and no extra claim of any sort will be entertained for plugging, desilting diverting the flow or pumping out water from the existing sewer line as well as from the trench, to any extent, and contractors should quote their rates accordingly.
- 83) All the existing street connections / cross sewer lines shall be transferred to the proposed sewer line. The tenderer should note that the sewer connections are to be made to the

existing Roboholes which may be in surcharge condition and no extra claim of any sort will be entertained for plugging, desilting diverting the flow or pumping out water from the existing sewer line as well as from the trench, to any extent, and contractors should quote their rates accordingly.

- 84) The contractor shall pay necessary royalties and submit documentary evidences of such payments to the Engineer for information and records. If and when royalties becomes payable to the Government Authority on excavated material as per statutory requirements, the payment shall be made by the contractor.
- 85) Contract Labour (Regulation and Abolition Act 1970): The Tenderer(s) should specifically note that the successful tenderer shall have to strictly comply with all the statutory requirement under the provision of the Contract Labour (Regulation and Abolition Act 1970 and with the Maharashtra State Contract Labour (Regulation and Abolition) Rules 1971 and indemnify the Corporation against any claim(s) whatsoever. It is mandatory on the part of the contractor to submit Registration Certificate issued by the office of Commissioner of Labour alongwith the documents for execution of written contract.
- 86) The tenderer should not stack or deposit the materials including the excavated materials on the footpaths, road which will affect the day to day cleanliness of the roads/footpath. If it is found that the materials stacked / deposited by any of the M.C.G.M. agencies, a heavy fine, as per the Bye-Laws "construction, Demolition, Disilting Waste (Management & Handling) Rules-2006" including the other penalties will be imposed.
- 87) All circulars published by BMC from time to time will be applicable to the Contractor.
- 88) To lay sewer lines along proposed D.P. roads only after obtaining demarcation from E.E(D.P.)WS(P&R)
- 89) 1) The Engineer not below the rank of Assistant Engineer is entitled to impose a penalty of Rs. 2500/- per day/lapse, in accordance to the gravity of default communicated in writing. Penalty amount will be recovered from contractors running bill.

If it is observed that, the contractor carrying out the work fails to comply with the instructions given by the authorities at the Ch.E.(Roads & Tr.)/ Director (ES & P)/A.M.C./M.C.'s level during execution of work twice, the work will be terminated and

will be carried out at the risk and cost of the contractor and penal action will be taken against them. This decision will not be arbitrable at all.

The above mentioned condition will be in addition to the relevant condition in the General Condition of contract regarding cancellation of contract in full or partly final decision of disputes, difference of claims raised by the contractor or relating to any matter out of contract.

2) Other penalties:-

In addition to any penal action under the General Conditions of Individual contracts, a registered contractor will be liable under the registration Rule to one or more of the following penalties:

a) Warning / Fine

A contractor will be liable to a warning and /or penalty for Non-compliance of any provision of the rules.

ii) Failure to comply with any clause or direction under these rules or comply with any conditions of e - Tenders / contracts.

iii) Inadequate progress / performance under the contract.

For the first default of any type mentioned above a warning will be issued. For each subsequent default of the types in (i) & (ii) above the minimum penalty will be fine of Rs. 2,500/- while that for a default of the type (iii) the minimum penalty will be Rs. 5,000/- for contracts of upto Rs. 25 Lakhs and Rs. 10,000/- for contracts of above Rs. 25 lakhs. Higher Amount of penalty may be levied by the competent authority for reasons to be recorded

90) Milestones and liquidated damages are as mentioned in table below, (as mentioned in Section 9, GCC clause no. 40 in SBD)

HDD- MILESTONE

Milestone dates:	Physical Works to be completed	Period from the date of	Liquidated Damages for failure to comply
-------------------------	---------------------------------------	--------------------------------	---

	Location	Ward	Dia (OD) In mm.	Length In Mtrs.	commenceme nt of the work	with the time for completion
Milestone-1 (2 Months)	Milestone – 1	K-West	450mm, 540mm , 355mm	200	2.0 Months	a.0.1% of contract Price of respective milestone per week of part thereof for delay upto and including 24 weeks. b. 0.75% of contract price of respective milestone -25 to 100 weeks. c.0.5% of contract price of respective milestone above 100 weeks. d. Maximum limit of liquidity damages for delay 10% of contract price.
Milestone-2 (5 Months)	Milestone – 2			200		
		K-West			5.0 Months	
Total Length in Mtrs. =				400		
Milestone-3 (8 months)	Milestone - 3			200		
		K-West			5 + 3= 8 months	
	Total Length in Mtrs. =				600	
Milestone-4 (11 Months)	Milestone - 4			195		
		K-West	355mm	795	8 + 3= 11 months	
	Total Length in Mtrs. =				815.00	
	Total Length in Mtrs. =				815.00	

91) Equipment Capabilities as required for this special work:-
The equipments / machineries as required for this bid are as follows,

3,92,08,620

PROFORMA VII Equipment Capabilities

Tenderer's Legal Name: [insert full name]

e-Tender No..... Date.....

Item of Equipment	Requirement, Nos.	Owned/ Leased / To be procured	Nos./ Capacity	Age/ Condition	Remarks - (Earliest date of mobilization of the equipment on worksite in Mumbai)
Construction Equipment					
1. HDD Machine with required capacity and ancillary equipments	One				

1. Mobile Crane 20 tons capacity	Two				
2. Excavator(5 ton)	Four				
3. Generator 200KVA (440Volts)	Four				
4. Drainage Pumps 20Kw & 10Kw	Four of 20 KW & Four of 10KW				
5. Buried Services Locator.	One				
6. Grouting pump (min 20psi pressure)	Four				
7. Portable Generator (minimum 40KVA)	Four				
8. Welding equipment	Two sets				
9. Vibratory Roller, Minimum 10 t	One				
10.H.D.P.E. Pipe welding machine	Two sets				
11.Trucks	Two				
12.Compressor with Chisel	Two				
13.Hydra	Two				
14 Splitter Machine with operator	Four				
15)HDD machine with required capacity and ancillary equipments capable of laying the pipes ranging from dia. 160mm upto 630mm	ii) 01 no. of HDD machine 160mm - 630 mm dia., he possess, or have assured access to (through hire, lease purchase agreement, availability of manufacturing capacity, or other means) (Tenderer must upload and submit supporting valid documents that he can mobilize on site all of this equipment within 30 days of the acceptance letter).				

Note: The tenderer should submit the above proforma with packet B .

The bidder need not own the machine & operator to break the rock having UCS upto 250Mpa. However he shall submit an undertaking to arrange machine & operator when required.

The bidder should submit the evidences on Rs 500/- stamp paper regarding credible machine availability to execute the work as per the phase wise programme in form of Agreement for procuring the machines. Bidder should submit document of ownership of machinery OR Assured access to be procured as mentioned in Proforma V- A & V- B

92) Additional Technical Personnel :-

- As it is a special work, sewer line laying by Trenchless Technology (i.e Microtunneling and pipe jacking / Horizontal Directional Drilling etc), it requires special operators for operating MTBM and HDD are as follows,

The e-tenderer must have suitably experienced personnel to operate the microtunneling / HDD equipment in soft and hard ground including extra-ordinary hard rock and varying and

waterlogged strata. The e-tenderer will supply information on master operator and assistant operators and their alternates. The prime and assistant operators shall be available throughout the construction period and should meet the experience requirements specified below:-

- **Master Operator**

The master operator or the alternate shall have driven HDD machines between 100 mm and above (similar to the tunneling equipment proposed for the project) for a length of at least 1000 meter in any variable soil conditions including hard rock and waterlogged ground conditions.

- **Assistant Operators**

The assistant operators shall have driven HDD machines between 100 mm and above (similar to the tunneling equipment proposed for the project) for a length of at least 500 meter in any variable soil conditions including hard rock and waterlogged ground conditions.

The e-tenderer shall note that the experience of the operators shall clearly show the length of tunneling done by them and the machines operated by them in addition to the experience in number of years.

Attested copies for qualification certificates and details of work experience shall be submitted

Note:

1. Bidders shall submit the undertaking for equipment capability and other undertakings as such on a single Rs.500/- stamp paper.

93.A) HEALTH AND SAFETY REQUIREMENTS

The Contractor shall comply at all times during the Contract with all relevant Indian health and safety legislation, and all amendments thereto and also IS 18001:2007 Occupational Health and Safety (OH&S) Management System.

1. Safe Systems of Work

The Contractor shall be responsible for all safety systems on site. Throughout the Contract

Period the Contractor shall:

- i) at all times maintain a safe system of working and shall comply with all enactments, regulations and working rules relating to safety, security, health and welfare of all persons who may be affected by his work

- ii) ensure that only persons who are properly trained for their duties are employed, that the correct tools and procedures are used and that adequate personal protective equipment is provided to all persons who may be affected by the work
- iii) carry out toolbox talks for all Contractor's Personnel at least once per week
- iv) erect suitable warning signs, barriers, etc. as necessary for the activity which is being carried out – the Contractor shall maintain such signs, barriers, etc for the duration of such activities
- v) submit to the Engineer, no later than 28 days before work commences on the Site, his Health and Safety Plan containing comprehensive proposals relating to the management of health, safety and welfare of all his personnel on the Site and all persons who may be affected by his work.

The Contractor shall be responsible for the safety of all his personnel and other persons directly or indirectly employed for the Works and shall take all measures at his own expense necessary to ensure their safety. In particular such measures to be taken by the Contractor shall include the following:

- i) Provision of proper safety and emergency plans and regulations; fire, gas and electric shock precautions, stretchers and first aid box together with rescue facilities generally for each place of working;
- ii) Provision of appropriate and effective safety work gear, including certified safety helmets and certified work boots for all personnel including the Engineer and each of his staff and any authorized visitors to the Site.
- iii) Safe control of the water table, including provision of ample standby generating and pumping plant to maintain dry conditions;
- iv) Provision and maintenance of suitable lighting to provide adequate illumination of works with appropriate spares and standby equipment;
- v) Provision and maintenance of safe, sound mechanical equipment, each item of plant having an up-to-date testing certificate;
- vi) Provision and maintenance of safe, sound ropes, slings, pulleys and other lifting tackle, each appliance having an up-to-date testing certificate, where appropriate;

- vii) Provision of notices on weather-proof boards measuring 1.25m x 1.5m in size, written in bold letters in English, Marathi and Hindi to be erected on existing footpaths and at points of access likely to be used by the public, which shall warn the public of the existence of the Works. These notices shall be in addition to any statutory requirements demanded of the Contractor.
- viii) Suitable scaffolds shall be provided for workmen for all activities that cannot be safely executed from the ground, or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra person shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds and handholds shall be provided on the ladder and the ladder shall be given an inclination not steeper than $\frac{1}{4}$ to 1 ($\frac{1}{4}$ horizontal and 1 vertical);
- ix) Scaffolding or staging 1 more than 3.25m above the ground or floor, swung or suspended from an overhead support, or erected with stationary support, shall have a guard rail properly attached, bolted, braced and otherwise secured at least 1 metre above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure;
- x) Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally, and if the height of a platform or stairway is more than 3.25 metres above ground level or floor level, it shall be closely boarded, have adequate width and be suitably fenced;
- xi) Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent fall of persons or materials by providing suitable fencing or railing with a minimum height of 1 metre;
- xii) Safe means of access shall be provided to all working platforms and other working areas. Every ladder shall be securely fixed. No portable single ladder shall be over 3 metres in length.
- xiii) The Contractor shall take adequate precautions to prevent danger from electrical equipment. No material on the Site shall be so stacked or placed as to cause danger or inconvenience to any person or the public.

xiv) Excavation and trenching: All trenches 1.5 metres or more in depth shall be considered confined spaces and shall at all times be supplied with at least one ladder every 30 metres, or fraction thereof. Ladders shall be extended from bottom of trench to at least 1 metre above surface of the ground. Sides of a trench which is 1.5 metres or more in depth shall be stepped back to give suitable slope, or securely held by timber bracing, to avoid the danger of sides collapsing. Excavated material shall not be placed within 1.5 metres of the edge of a trench, or half of the depth of the trench, whichever is more. Cutting shall be done from top to bottom. Under no circumstances shall undermining or undercutting be done.

xv) Demolition: Before any demolition work is commenced and also during the process of the work:

a) All roads and open areas adjacent to the work Site shall either be closed or suitably protected.

b) No electric cable or apparatus which is liable to be a source of danger other than a cable or apparatus being used by an operator shall remain electrically charged.

c) The Contractor shall take all practical steps to prevent danger to persons employed from risk of fire or explosion, and the Contractor shall ensure that no part of a building shall be so overloaded with debris or materials as to render it unsafe.

xvi) All necessary personal safety equipment shall be provided by the Contractor for use by persons employed on the Site and maintained in a condition suitable for immediate use, and the Contractor shall take adequate steps to ensure proper use of equipment by those concerned:

a) Workers employed on mixing asphaltic material, cement and lime mortars / concrete shall be provided with protective footwear, gloves and goggles.

b) Those engaged in handling any material which is injurious to eyes shall be provided with protective goggles.

c) Those engaged in welding works shall be provided with welder's protective eye shields.

d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

e) Those working with loud machinery or near loud activities shall be provided with appropriate ear protection such as ear muffs.

- f) When workers are employed in sewers and Roboholes, which are in use, the Contractor shall ensure that Robohole covers are opened and Roboholes are ventilated by mechanical means for at least one hour before workers are allowed entry. Roboholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to public.
- xvii) When work is done near any place where there is a risk of drowning, all necessary equipment shall be provided by the Contractor and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision made for prompt first aid treatment of all injuries likely to be sustained during the course of the work;
- xviii) Use of hoisting machines and tackle including their attachments, anchorage, and supports shall conform to the following:
- a) These shall be of good mechanical construction, sound material and adequate strength and free from patent defects and the Contractor shall keep same in good repair and in good working order.
 - b) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from patent defects.
 - c) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years shall be in charge of any hoisting machine including any scaffold winch or give signals to operator.
 - d) In the case of every hoisting machine and of every chain ring hook, shackle, swivel and pulley block used in hoisting or lowering or as a means of suspension, safe working load shall be ascertained by the Contractor by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with safe working load by the Contractor. In case of a hoisting machine having a variable safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated by the Contractor. No part of any machine or of any gear referred to above in this paragraph shall be loaded beyond safe working load except for the purpose of testing.
 - e) The Contractor shall notify safe working load of each machine to the Engineer whenever he brings it to Site.

- xix) Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards. Hoisting appliances shall be provided with such means as will reduce to the minimum risk of accidental descent of load. Adequate precautions shall be taken to reduce to the minimum risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel such as gloves, sleeves and boots, as may be necessary, shall be provided. Workers shall not wear any rings, watches and carry keys or other material which are good conductors of electricity;
- xx) All scaffolds, ladders and other safety devices shall be maintained in a safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near places of work;
- xxi) These safety provisions shall be brought to the notice of all concerned by display on notice board at a prominent place at the work spot. Persons responsible for ensuring compliance with the safety provisions shall be named therein by the Contractor;
- xxii) To ensure effective enforcement of the rules and regulations relating to safety precautions, arrangements made by the Contractor shall be open to inspection by the Engineer and any safety inspection officer.
- xxiii) All movement of vehicles to and from the sites shall comply with the Traffic Management Plan and in the Traffic Management Requirements

Notwithstanding the above provisions, the Contractor is not exempted from the requirements of any other Laws in force. The Contractor shall submit to the Engineer for review detailed proposals under (i) above in conjunction with detailed construction and installation method statements for each element of work to be undertaken. When accepted by the Engineer, and before the work is started, the Contractor shall distribute copies in English or in other language as appropriate to all his employees and to the Engineer.

The Contractor shall ensure that all his employees are fully conversant with the plans and regulations and the Contractor shall enforce the rule that any employee committing a serious breach of such plans and regulations shall be instantly dismissed and shall not be reemployed.

2. Paint

Paint or other products containing lead shall not be used.

3. First Aid and Life-saving apparatus

The Contractor shall provide on the Site such life-saving apparatus as may be appropriate and shall provide, equip and maintain at the Site of Works first aid boxes as directed and shall be subject to approval by the Engineer for the use of his own as well as Engineer's Personnel on Site. In addition, the Contractor shall instruct an adequate number of persons permanently employed at the Site in the use of the apparatus and equipment. The Contractor shall advise the Engineer of measures to be taken in the event of a serious accident. The Contractor shall post a list of emergency telephone numbers (including ambulance) at several locations on site.

4. Electrical Safety

While any electrical equipment is being installed or tested, the Contractor shall ensure that all necessary precautions are taken to safeguard personnel working on Site. If necessary, this shall include fencing off areas that are considered to pose a risk, and erecting warning notices.

The Contractor shall ensure that the installation of electrical equipment is carried out by suitably trained competent personnel and that the work is carried out in a safe manner. No electrical cables shall be laid across rebar. No joints or repairs shall be made to cables except by suitably trained competent personnel using appropriate protective equipment. All power sockets used on the Site shall be protected by a residual current service.

The Contractor shall be responsible for the operation on the Site of a permit to work system during the period of electrical equipment installation and testing. This system shall regulate the installation, the energising and the use of electrical Plant installed and the method of work adopted.

5. Asbestos

The Contractor shall not use any product that contains crocidolite (blue asbestos). Prior to use of any asbestos materials, whether in permanent works or temporary works, the Contractor shall submit to the Engineer for review evidence that his insurance policies permit the use of asbestos. The Contractor shall notify the Engineer of the presence of asbestos on site throughout the entire Contract Period, including the Operation Service Period. When handling any asbestos materials he shall comply with all appropriate national and internationally accepted regulations and codes of practice relating to the handling and disposal of asbestos.

6. Supply of Potable Water and Sanitation Facilities

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of fresh and chlorinated potable water suitable for drinking and other water for the use of the Contractor's staff on a daily basis. The Contractor shall also provide sanitation facilities for his staff employed on the site for the duration of the Contract.

7. Measures against Insect and Pest Nuisance

The Contractor shall at all times take the necessary precautions to protect the Contractor's staff employed on the Site from insect and pest nuisance, and to reduce their danger to health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

8. Measures against Sunburn and Heat Exhaustion

The Contractor shall at all times take the necessary precautions to protect the Contractor's staff employed on the Site from sunburn and heat exhaustion including provision of adequate breaks.

9. Alcoholic Liquor or Banned Substances

The Contractor shall not allow alcoholic liquor or banned substances on site. The Contractor shall not import, sell, give barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter or disposal thereto by Contractor's staff.

10. Arms and Ammunition

The Contractor shall not allow arms and ammunition of any kind on the site. The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's staff to do so.

11. Festivals and Religious Customs

The Contractor shall respect the Country's recognized festivals and religious or other customs.

As a minimum, the statutory/mandatory holidays as declared by the Central and State governments shall be adhered to by the Contractor

12. Employment Records of Workers

The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers.

The Contractor shall summarise these records on a monthly basis and submit to the Engineer, and the Contractor shall make these records available for inspection during normal working hours.

13. Repatriation of Labour

The Contractor shall be responsible for the return of persons (recruited and employed for the purpose of or in connection with the Contract) to the place from where they were recruited or to their domicile and shall maintain such persons in a suitable manner until they shall have left the Site or, in the case of persons who are not nationals of and have been recruited from outside India, shall have left India.

14. Epidemics

In the event of any outbreak of illness of an epidemics nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary authorities, for the purpose of dealing with and overcoming the same. In the event of any outbreak of illness of an epidemics nature, the Contractor shall comply with and carry out such regulations, orders and requirements as maybe made by the Government, or the local medical or sanitary authorities, for the purpose of dealing with and overcoming the same

15. Burial or Cremation of the Dead

The Contractor shall make all necessary arrangements for the transport, to any place as required for burial or cremation, of any of his expatriate employees or members of their families who may die in India. The Contractor shall also be responsible to the extent required by the local regulations, for making any arrangements with regard to burial or cremation or any of his locally employed personnel who may die while engaged upon the Works.

16. BMC Health Department Guidelines

The Contractor shall keep a check on the health of all labour / employees as per BMC Health Department Guidelines.

17. Micro Tunnel Safety

17.1 General

The Contractor shall submit descriptions of the installations he proposes to use for supply of water, ventilated air, compressed air, lighting, power supply, etc., and for the disposal of drainage and waste water, contaminated air, etc., for the acceptance of the Engineer in advance of starting underground works.

The tunnelling work shall be carried out in accordance with the following:

Government of India Rules and Regulations, The Contractor's Health and Safety Plan

17.2 Telephone Communications to tunnels

The Contractor shall provide and maintain in good working order an internal site telephone system with instructions prominently displayed as near to every tunnel working face as is practicable, and linked to the appropriate Working Sites on the surface. The telephone network should be provided for Engineer's office including telephone connection to the work's place and tunnel shafts.

17.3 Electric Cables

All lighting and power cables installed underground shall be adequately insulated with joints made in an agreed manner. All installation and maintenance work shall be done by qualified personnel to a high standard. Cables shall be securely fixed above floor level with the exception of cables needed for occasional work. Separate circuit breaker systems shall be provided for the supply of power for equipment and for lighting, respectively, and they shall be kept well separated from signalling and telephone cables. All electric installations shall be adequately earthed in accordance with normal practice and local requirements and be accepted by the Engineer. Installations shall furthermore be protected by earth-fault breakers, all in accordance with current practice and safety standards and accepted by Engineer.

17.4 Ventilation System

During the construction of the works, but not during operation, the Contractor shall provide an underground ventilation system which shall be capable of serving all areas where work is going on. After installation, the ventilation ducts shall be checked at regular intervals and any damage, which might decrease their efficiency, shall immediately be repaired. Spare ducts and spare ventilators shall be available on Site for this purpose. The ventilation system shall be designed such that the temperature at the working face does not exceed 32°C. The ventilation system shall be removed on

completion of the Works. Petrol engines shall not be permitted underground.

Diesel plant used underground shall be fitted with suitable emission control equipment to maintain the tunnel environment in accordance with the requirements of the Factories Regulations. The engines shall be regularly checked and kept well-adjusted so that all

harmful substances in the exhaust gases and smoke are kept to the minimum. An electronic gas detector approved by the Engineer shall be maintained at each tunnel face or shaft bottom at all times, and wherever a person is working within the tunnel. The Contractor shall perform continual measurements of gas pollution underground along the length of the tunnel in order to detect at an early stage the presence of carbon monoxide, nitrogen dioxide, methane and other harmful or explosive gases. In doing so, the Contractor shall ensure that pollution percentages including that resulting from dust are kept within acceptable limits according to internationally recognised standards. The results of measurements shall be recorded and submitted to the Engineer.

The Contractor shall ventilate the underground works so that at all times, the concentration of contaminants in the atmosphere is kept below levels that can cause damage to health. The oxygen content of the air shall not be less than 20% and the absolute limits of concentration of nitrous fumes, carbon monoxide and carbon dioxide shall be 5 ppm, 10 ppm and 5000 ppm respectively by volume.

Clean fresh air shall be supplied by forced ventilation at the rate of not less than 5.7m³/minute per worker, 2.5 m³/minute per diesel HP, or 13m³/minute/m² face area in the tunnel, whichever is the greatest. The ventilation system shall be so arranged that air may be blown into or drawn from the face. The ducting shall be properly maintained and kept free from leaks and other defects. At least once in every shift, the Contractor shall test the quality of air to ensure that it remains within the requirements of the Factories Regulations. If the presence of other gases not specified or other contamination is suspected, suitable methods of detection shall be implemented.

Precautions shall be taken to minimise dust production. Where sprayed concreting or mechanical excavation operations are being carried out such additional measures shall be taken by the Contractor as are required to allow safe and proper execution and inspection of the work. The measures shall include, inter alia, the use of respirators, breathing apparatus or auxiliary fans.

17.5 Lighting

All underground areas where work is going on shall be illuminated with electric lights of adequate strength and number to allow work, inspection, mapping and surveying to be carried out in a proper and safe manner. The Contractor shall provide lighting at the working face or at any operation where more than five operatives are working, with a minimum illumination of 100 Lux. Elsewhere in the tunnel including walkway the

minimum illumination shall be 50Lux at walkway level. Battery operated emergency lights shall be provided at appropriate intervals

17.6 Walkway

The Contractor shall provide a dedicated prefabricated walkway with a non-slip surface in each tunnel where human access is required throughout its construction

17.7 Access Ladders

The Contractor shall provide and maintain throughout the Contract adequately protected and secured access ladders and landings in shafts, together with guard rails and toe boards.

17.8 Fire Precautions and Evacuations in Tunnels

The Contractor shall submit a comprehensive plan concerning Fire Precautions and Evacuations in Tunnels, both during boring and the equipment installation phase, to the Engineer for acceptance. The following shall be addressed:

- a) Burning and welding.
- b) Materials to be used.
- c) Any other activities, which may pose a fire risk.
- d) Fire fighting equipment.
- e) Fire fighting procedures (including fire drill).

Confined Spaces

1 Control of Access to Underground Works

The Contractor shall operate and maintain throughout the contract a control-of-entry system for the underground works which will provide a record of who is underground at any time, for use in emergencies. Nobody shall be allowed underground without recording their presence using the established system.

2 Control of Access to Existing Underground Structures

Where existing Underground Structures have to be entered the Safety Officer must be informed in advance and the following precautions must be taken:

- a) Air quality / gas testing must be carried out before entry

b) There shall be an agreed system in place for rescue of injured or incapacitated persons underground

c) All persons entering existing underground structures shall have received training in the hazards of confined spaces.

93.B) Section A -- Technical specifications:

Being a special work, additional special directions regarding Technical specifications for laying sewer line by Trenchless technology. (i.e. Microtunneling boring and pipe jacking, manual boring and pipe jacking and HDD etc.) are as below,

Part I General

1.1 Specification

These specifications are intended for general description of quality and workmanship of materials and finished work. They are not intended to cover minute details. The work shall be executed in accordance with best modern practices and using special techniques of trenchless technology.

The Contractor shall read this Specification in conjunction with the standard specification of the Municipal Corporation of Greater Mumbai for sewerage and water pipe line works.

1.2 Contractor's obligations

The clauses in this section are meant to provide general guidelines and compliance requirements to the Contractor. It does not however relieve the Contractor from taking every other steps and precautions as deemed necessary to complete the installation of the pipelines successfully within the specified contract period and the bided amount.

Microtunneling and pipe jacking and any other methods under trenchless technology domain are the Trenchless Techniques adopted for minimizing excavations and avoiding conventional trenching. Unless otherwise provided or permitted Microtunneling and Pipe jacking should be considered to be the method required to be adopted for laying the pipelines under the contract. Any other trenchless method may be permitted in case of packages where such methods are found essential as per the conditions prevailing at the time of execution with prior approval by the Engineer without any extra cost to the Employer. However, the Contractor shall be solely responsible for adequacy and safety of any of the techniques to be used.

The Engineer reserves right to change the alignment to suit the site conditions, amend the scope of work, to delete any package, to replace any package or curtail scope of work without thus incurring any liability on the Engineer or the Employer.

Furthermore, the consideration that microtunneling method permitted as a suitable method of installing the sewer pipelines in the Specification shall not relieve the Contractor in any way from his prima facie obligation and responsibility under the contract to successfully install the pipelines without causing interruptions to train / vehicular / pedestrian traffic and within the specified contract period and contract amount.

The Contractor's rates in the Bill of Quantities shall be deemed to be for installing the pipelines successfully within the specified contract period regardless of the method considered in the specification as a suitable trenchless method.

If, in the opinion of the Contractor, other methods are considered suitable to achieve the desired objectives of installing the pipelines or sites with working space constraints within the specified contract period and quoted amount and without causing interruptions to train and road traffic at the sites across bridges and narrow roads, he shall make a detailed proposal of the method to the Engineer for his consideration and acceptance. Unless the method so proposed is considered superior to the specified method and essential considering the site conditions, no consideration will be given by the Engineer to accept the Contractor's proposal. It may however be noted that the bid shall be evaluated as per the response to the Engineer's BOQ's only.

1.3 Background information of the project

Mumbai is the capital of the State of Maharashtra in the Republic of India. It is located on the West Coast of India at latitude 19°N and longitude 72° 50'E. It is an island connected with main land by road, rail and air. The city and suburbs are administered by the Municipal Corporation of Greater Mumbai (BMC).

The annual rainfall in Mumbai is of the order of 2500 mm, most of which is precipitated within 4 months of monsoon from June to September, leaving a dry working period of 8 months from October to May. Mean daily temperature varies from about 22° C to 36°C, the hotter months generally being March, April, May and June. The relative humidity is generally between 48% and 87% highest being in the monsoon period from June to September. Some of the suburban areas are reclaimed land and the water table is generally high.

BMC is responsible for providing public sewerage and water supply facilities for the city and suburbs, covering an area of about 437.71Sq km.

Under the sewerage development master plan known as MSDP Stage II Master plan or as required, the Corporation proposes to upsize existing sewer capacity at various places by providing additional sewer line along the existing sewers and provide for proper flow transfer from existing as well as new connections at places directed by the Engineer in order to provide upsized hydraulic capacity for the finally developed sewerage network. The works under reference are part of this objective or/and very fast developments of the areas in recent past and are to be carried out in the City and Western suburb area of Greater Mumbai, in general. The proposed length of the pipelines to be installed under the Contract is about 5.013 Km. approx. The diameters of the pipelines range from 800mm&1800mm either as direct carriers or through sleeves. The completed pipelines must be tested and handed over to the Sewerage Operations department of BMC i.e user department.

It shall be obligatory for the Contractors to carry out geotechnical investigations as considered necessary by them and satisfy themselves of the adequacy of their testing. They shall ensure that the methods and equipment they proposed are in accordance with the geotechnical and other requirements pertaining to the sites. The Employer / Engineer shall not be responsible for any changes in method or equipment necessitated during execution of the work and it shall be contractors' sole responsibility to ensure deployment of proper method and equipment for the work.

The e-tenderers shall, on his own accord collect information about likely geotechnical conditions at the sites. Any risks assumed by the applicant by solely depending on his current knowledge of the sites of the information currently available on the ground condition any physical obstructions and geological and geotechnical data on soils/rock of the area shall be entirely his own and shall be wholly and fully responsible for any consequential expenses arising as a result of the risk he assumed. He shall not resort to any compensation claim under the contract for differing ground condition that he may encounter as a result of assuming the risk.

The extent and scope of the applicant's geological and geotechnical investigation along the final pipeline route would depend on the type and model of the systems that he proposes to use in the project. The applicant shall therefore carry out the necessary geological and geotechnical investigation of the sites and testing of the soils/rock (to determine compressive and tensile strength, abrasivity, mineral composition of the rock etc.) to be encountered along the pipeline route in the sites, as deemed necessary.

The applicant shall ensure that the Trenchless Technology system including where Microtunneling is stipulated as mandatory shall successfully excavate in the wide ranging ground

conditions, from water charged clayey strata with boulder's to rocky strata, likely to be encountered at the sites.

1.4 Operational Facility

The Contractor is advised that there may be other Contractors (i.e. from PWD Railways or other authorities including BMC) working within the site area. The Contractor may therefore be given joint possession, in some sections of the sites, with the other Contractors for the purpose of carrying out his contractual obligation and he shall in no way interfere with, impede or otherwise prevent these other Contractors, from carrying out their contractual obligations. The Contractor shall allow in his prices, when bidding, for affording reasonable facilities to the other Contractors and for any interference with his work from these other contract operations.

1.5 Directions for the Manual Pipe Jacking Work

- 1) The Contractors shall make necessary arrangements for getting permission from Traffic Police Dept. Only recommendation letter will be issued by BMC. The Contractor shall also provide safety barriers, warning signs, signboards, beacons, barricades, lighting, fencing , illuminated traffic diversion signs, flashers etc. well in advance of the work site etc. for ensuring smooth and properly guided traffic flow.
- 2) The circular / rectangular jacking pit of size capable to accommodate jacking equipment and pipes, up to required depth, shall be excavated.
- 3) The vertical face of the excavated pit shall be properly protected & stabilized by providing shoring M.S. Sheet piles / liner plates, ring beams, Solider piles with lagging, precast concrete segments, RCC piles or by any other method other than mentioned in BOQ which will not be paid. Necessary geotechnical survey shall be carried out and shoring shall be designed with respect to soil / rock properties encountered in the pit. In addition to above the contractors shall make necessary arrangement if required, for stabilization of soil / rock by shotcrete, grouting, slurry walls, tie rods, anchor rods, expansion bolts, wire mesh etc., for which no extra payment will be made. The contractors shall also allow in his rate for protecting, supporting any utilities in the excavation of jacking pit. Proper dewatering arrangement shall be made by the contractors for which no extra payment will be made.
- 4) Cement concrete base of grade M-20, of thickness 30 cm shall be provided in the pit. Thrust wall of M-40 grade concrete shall be provided within shaft to evenly transfer the jacking force. It shall be ensured that the thrust wall and the soil behind are in complete contact and there is no gap in between. The jacking frame shall be set up in the shaft in correct alignment.

The jacking frame shall comprises of high thrust hydraulic jacks capable of exerting required jacking force against thrust wall to push the pipes forward, through the bored ground.

- 5) Initially, a circular bore for half length of jacking pipe shall be excavated in the correct line & level, for laying downstream side sewer pipes. The oversize allowable in the excavation shall not be more than 5% of pipe OD. After boring half pipe length, the RCC NP-4 class jacking pipe of 1200 -1800 mm dia, is pushed by jacking in the bore. Further horizontal excavation shall then be carried out by sending skilled labour through the RCC jacking pipe by any means i.e. chiselling, using splitter machine, etc. The excavated material shall be removed from the bore and shaft simultaneously, and shall not be stacked around the pit.
- 6) The horizontal bore excavation will be measured and paid only in R.M. length as per rate of the contract, and contractors shall allow in his rate for boring in wide range of ground, comprising of soil / clay / sand / soft rock / very hard rock with UCS more than 350 mpa / boulders. In case of soft soil / weathered or shattered rock, it shall be stabilized by any means stated in para 3 above, for which no extra payment will be made. Under any circumstances, the contractors shall be solely responsible for safety and security of life & limbs of workers and to arrest settlement so as to safeguard integrity of road surface above.
- 7) Proper safety accessories such as overhead cage, helmets, footwear, gloves, safety belts, oxygen cylinders & masks shall be provided by the contractors. Contractors shall also provide adequate ventilation by means of blowers etc. to keep the existing Roboholes and excavated bore, free from all dangerous gases.
- 8) The RCC jacking pipe 1200 -1800 mm dia, of minimum NP-4 class, shall meet the basic requirements specified in IS 458 & IS 3597 shall be tested and approved by Engineer. The spigot ended jacking pipe with recess to receive rubber ring & M.S. collars welded to reinforcement inside and the spigot & socket joint shall be flush from outside. The rubber ring shall meet the requirement of IS 5328 and testing shall confirm to IS 3400 & 5382. The M.S. collar shall be coated with anti-corrosive & anti abrasive paint such as polymorphic resin or other material approved by the Engineer.
- 9) The cyclical process of excavation, removal of excavated material and pushing the pipe forward will be continued till the sleeve pipe reaches existing Robohole face, where sewer line is to be connected. The alignment & levels of the pipe shall be checked at every stage.
- 10) After completing the drive, annular space between outer face of jacking pipe and excavated surface shall be grouted by pumping cement mortar 1:3, (for which no extra payment will be made) so that there should not be any voids left in between.

- 11) The RCC NP-3 class carrier pipe if any is then inserted, jointed and pushed through RCC NP-4 class jacking sleeve pipe, and is then finally connected to the existing Robohole by making hole from inside the Robohole. The connection shall be made watertight.
- 12) Circular / Scrapper Robohole, shall then be constructed at jacking pit location.
- 13) The contractors shall carry out the reinstatement of the road foundation and road surface in accordance with existing road crust and as per specifications of MORTH / PWD / BMC. The broken existing storm water drain shall also be reconstructed to its original shape and size.
- 14) Upon completion of work, the sewer line shall be hydraulically tested as per required pressure and after successful testing, contractor must clean the site to the satisfaction of Engineer. The sewer line shall be handed over to the user dept (Sewerage Operation Dept) under proper acknowledgement and certificate to this effect. Hydraulic testing and site cleaning is to be done by the contractors at his own cost and no extra payment shall be admissible.

1.6 GENERAL SPECIFICATIONS FOR HORIZONTAL DIRECTIONAL DRILLING (HDD) / HDPE PIPE

1. Scope of Work

The Permanent Works under this contract shall include but not be limited to the following:

- 1.1. The installation complete of reinforced cement concrete / MS / HDPE pipeline pipes or other pipes including fittings or specials as specified and as approved by the Engineer in the following distinct fronts under the contract.
- 1.2. Testing under supervision of the BMC's Sewerage Operations department's staff and handing over to that department upon successful testing.
- 1.3. The constructions complete of all the Roboholes, special chambers, drop arrangements pipes, vent shafts etc.
- 1.4. Transferring of existing working connections by appropriate enabling arrangements without unduly affecting the functioning of the existing sewer. The work may require trenchless technology/ Microtunneling or conventional open excavation for laying such connections.
- 1.5. Providing new connections by appropriate enabling arrangements. The work may require trenchless technology/ Microtunneling or conventional open excavation for laying such connections.

- 1.6. Ancillary and incidental works and all necessary works required to complete the work successfully and to entire satisfaction to the Engineer.
- 1.7. The work will have to be done in a planned manner so that sewage flow is not disrupted even partially for more than 24 hours.
- 1.8. The Engineer reserves right to change the alignment to suit the site conditions, amend the scope of work, to delete any package, to replace any package or curtail scope of work without thus incurring any liability on the Engineer or the Employer.
- 1.9. Furthermore, the consideration that Microtunneling method/ Horizontal Directional Drilling Method permitted as a suitable method of installing the sewer pipelines in the Specification shall not relieve the Contractor in any way from his prima facie obligation and responsibility under the contract to successfully install the pipelines without causing interruptions to train and motor traffic and within the specified contract period and contract amount.
- 1.10. The Contractor's rates in the Bill of Quantities shall be deemed to be for installing the pipelines successfully within the specified contract period regardless of the method considered in the specification as a suitable trenchless method.
- 1.11. Design Life. - For the purpose of designing the pipelines and the associated structures, the design life shall be 80 years. The materials incorporated in the works and the workmanship shall be of required quality to sustain the specified life span.

A. General:

It is the intent of this specification to define the acceptable methods and materials for installing sanitary sewer and water mains by the horizontal directional drilling method and the requirements for high density polyethylene (HDPE) pipe installed by directional drilling or in open cut trenches.

B. Installation Plan:

1. At least 7 days prior to mobilizing equipment Contractor shall submit his detailed installation plan to the Engineer. The plan shall include a detailed plan and profile of the bores and be plotted at a scale no smaller than 1 inch equals 20 feet horizontal and vertical.
2. The plan shall also include a listing of major equipment and supervisory personnel and a description of the methods to be used.

C. Variations in Plan or Profile:

The Contractor may request changes to the proposed vertical and horizontal alignment of the installation and the location of the entry and exit points. Proposed changes shall be submitted in writing to the Engineer and receive approval of the Engineer prior to construction.

D. Alignment:

The proposed plan and profile installation locations are based on alignments to accommodate acquired easements, to avoid obstructions, and to properly maintain operation flow velocities.

1.7 MATERIALS:

A. General:

High density polyethylene pipe in accordance with IS 14333 specifications shall be used in HDD installations. All piping system components shall be the products of one manufacturer.

B. Piping and Bends:

Piping and Bends shall be extruded from a polyethylene compound and shall conform to the following requirements:

1. The polyethylene resin shall meet or exceed the requirements of IS 7323
2. The polyethylene compound shall be suitably protected against degradation by ultraviolet light by means of carbon black, well dispersed by pre-compounding in a concentration of not less than 2.5 per cent.
3. The pipe manufacturer shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements of the resin manufacturer for the resin used to manufacture the pipe in this project.
4. The pipe and bends shall have a minimum standard dimension ratio (SDR) wall thickness as specified by the Engineer.
5. Joining shall be performed by thermal butt-fusion in accordance with the manufacturer's recommendations.

C. Procedures:

1. General:

All polyethylene pipe shall be cut, fabricated, and installed in strict conformance with the pipe manufacturer's recommendations. Joining, laying, and pulling of polyethylene pipe shall be

accomplished by personnel experienced in working with polyethylene pipe. The pipe supplier shall certify in writing that the Contractor is qualified to join, lay, and pull the pipe or representative of the pipe manufacturer shall be on site to oversee the pipe joining. Expense for the representative shall be paid for by the Contractor.

2. Transportation:

Care shall be taken during transportation of the pipe to ensure that it is not cut, kinked, or otherwise damaged.

3. Storage:

Pipes shall be stored on level ground, preferably turf or sand, free of sharp objects which could damage the pipe. Stacking of the polyethylene pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature condition. Where necessary due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such widths as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

4. Handling Pipe:

The handling of the joined pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Ropes, fabric, or rubber protected slings and straps shall be used when handling pipes. Chains, cables, or hooks inserted into the pipe ends shall not be used. Two slings spread apart shall be used for lifting each length of pipe. Pipe or fittings shall not be dropped onto rocky or unprepared ground. Slings for handling the pipeline shall not be positioned at butt-fused joints. Sections of the pipes with cuts and gouges exceeding 10 per cent of the pipe wall thickness or kinked sections shall be removed and the ends re-joined.

The open ends of all sections of joined and/or installed pipe (not in service) shall be plugged at night to prevent animals or foreign material from entering the pipe line or pipe section.

Waterproof nightcaps of approved design may be used but they shall also be so constructed that they will prevent the entrance of any type of natural precipitation into the pipe and will be fastened to the pipe in such a manner that the wind cannot blow them loose.

The practice of stuffing cloth or paper in the open ends of the pipe will be considered unacceptable.

Where possible, the pipe shall be raised and supported at a suitable distance back from the open end such that the open end will be below the level of the pipe at the point of support.

1.8INSTALLATION:

Selection of HDD Equipment

The contractors shall be responsible for the selection of a suitable HDD machine capable of excavating the materials including hard rocks, clay, sand, mixed ground etc. that may be encountered at the sites.

The Engineer's representative shall have full authority to inspect any material or finished product and reject the same if not found conforming to the standards. The Contractors shall make his representative available to the Engineer's representative during such inspections and testing failing which the Engineers representative shall be at liberty to take ex-party decision which shall become binding upon the Contractor.

A. General:

1. The Contractor shall install the pipelines by means of horizontal directional drilling. The Contractor shall assemble, support, and pre test the pipeline prior to installation in the directional drill tunnel.
2. Horizontal directional drilling shall consist of the drilling of a small diameter pilot hole from one end of the alignment to the other, followed by enlarging the hole diameter for the pipeline insertion. The exact method and techniques for completing the directionally drilled installation will be determined by the Contractor, subject to the requirements of these Specifications.
3. The Contractor shall prepare and submit a plan to the Engineer for approval for insertion of the HDPE pipe into the opened bore hole. This plan shall include pullback procedure, ballasting, use of rollers, side booms and side rollers, coating protection, internal cleaning, internal gauging, hydrostatic tests, dewatering, and purging.
4. The required piping shall be assembled in a manner that does not obstruct adjacent roadways or public activities. The Contractor shall erect temporary fencing around the entry and exit pipe staging areas.
5. Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of Engineer.

B. Joining Pipe Sections:

1. Each length of pipe shall be inspected and cleaned as necessary to be free of debris immediately prior to joining.

2. Pipes shall be joined to one another by means of thermal butt-fusion. Polyethylene pipe lengths to be joined by thermal butt fusion shall be of the same type, grade, and class of polyethylene compound and supplied from the same raw material supplier.

3. Mechanical connections of the polyethylene pipe to auxiliary equipment shall be through flanged connections which shall consist of the following:

a. A polyethylene “sub end” shall be thermally butt-fused to the ends of the pipe.

b. Provide ASTM A240, Type 304 stainless steel backing flange, 125- pound, ANSI B16.1 standard, and gaskets as required by the manufacturer.

c. Stainless Steel bolts and nuts of sufficient length to show a minimum of three complete threads when the joint is made and tightened to the manufacturer’s standard. Re-torque the nuts after 4 hours.

d. Butt-Fusion Joining: Butt-fusion of pipes shall be performed in accordance with the manufacturer’s recommendations as to equipment and technique. Butt-fusion joining shall be 100% efficient offering a joint weld strength equal to or greater than the tensile strength of the pipe.

C. Tolerances:

1. Pipe installed by the directional drilled method must be located in plan as shown on the Drawings, and must be no shallower than shown on the Drawings unless otherwise approved. The Contractor shall plot the actual horizontal and vertical alignment of the pilot bore at intervals not exceeding 60 M. This “as built” plan and profile shall be updated as the pilot bore is advanced. The Contractor shall at all times provide and maintain instrumentation that will accurately locate the pilot hole and measure drilling fluid flow and pressure. The Contractor shall grant the Engineer access to all data and readout pertaining to the position of the bore head and the fluid pressures and flows. When requested, the Contractor shall provide explanations of this position monitoring and steering equipment. The Contractor shall employ experienced personnel to operate the directional drilling equipment and, in particular, the position monitoring and steering equipment. No information pertaining to the position or inclination of the pilot bores shall be withheld from the Engineer.

2. For gravity sanitary sewer installations, sags in the pipeline shall not exceed 25 per cent of the nominal pipe diameter. Sags will only be allowed where the entering and exiting grades are adequate to provide velocities through the sag area sufficient for moving solids. No more than one (1) sag area shall occur between two (2) Roboholes. The alignment of each pilot bore must

be approved by the Engineer before pipe can be pulled. If the pilot bore fails to conform to the above tolerances, the Engineer may, at his option, require a new pilot boring to be made.

3. After the pipe is in place, cleaning pigs shall be used to remove residual water and debris. After the cleaning operation, the Contractor shall provide and run a sizing pig to check for anomalies in the form of buckles, dents, excessive out-of-roundness, and any other deformations. The sizing pig run shall be considered acceptable if the survey results indicate that there are no sharp anomalies (e.g. dens, buckles, gouges, and internal obstructions) greater than 2 per cent of the nominal pipe diameter, or excessive ovality greater than 5 per cent of the nominal pipe diameter. For gauging purposes, dent locations are those defined above which occur within a span of 1.5 m or less. Pipe ovality shall be measured as the per cent difference between the maximum and minimum pipe diameters. For gauging purposes, ovality locations are those defined above which exceed a span of 1.5 m.

D. Ream and Pullback:

1. Reaming: Reaming operations shall be conducted to enlarge the pilot after acceptance of the pilot bore. The number and size of such reaming operations shall be conducted at the discretion of the Contractor.
2. Pulling Loads: The maximum allowable pull exerted on the HDPE pipelines shall be measured continuously and limited to the maximum allowed by the pipe manufacturer so that the pipe or joints are not over stressed.
3. Torsion and Stresses: A swivel shall be used to connect the pipeline to the drill pipe to prevent torsion stresses from occurring in the pipe.
4. The lead end of the pipe shall be closed during the pullback operation.
5. Pipeline Support: The pipelines shall be adequately supported by rollers and side booms and monitored during installation so as to prevent over stressing or buckling during the pullback operation. Such support/rollers shall be spaced at a maximum of 18 m. on centres, and the rollers to be comprised of a non-abrasive material arranged in a manner to provide support to the bottom and bottom quarter points of the pipeline allowing for free movement of the pipeline during pullback. Surface damage shall be repaired by the Contractor before pulling operations resume.

Pipe rollers shall be of sufficient size to fully support the weight of the pipe while being hydro tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe. Rollers shall be used as necessary to assist in pull back operations and in layout/jointing of piping.

6. The contractor shall at all times handle the HDPE pipe in a manner that does not over stress the pipe. Vertical and horizontal curves shall be limited so that wall stresses do not exceed 50% of yield stress for flexural bending of the HDPE pipe. If the pipe is buckled or otherwise damaged, the damaged section shall be removed and replaced by the Contractor at his expense. The Contractor shall take appropriate steps during pullback to ensure that the HDPE pipe will be installed without damage.

E. Handling Drilling Fluids and Cuttings:

1. During the drilling, reaming, or pullback operations, the Contractor shall make adequate provisions for handling the drilling fluids, or cuttings at the entry and exit pits. To the greatest extent practical, these fluids must not be discharged into the waterway. When the Contractor's provisions for storage of the fluids or cuttings on site are exceeded, these materials shall be hauled away to a suitable legal disposal site. The Contractor shall conduct his directional drilling operation in such a manner that drilling fluids are not forced through the sub bottom into the waterway. After completion of the directional drilling work, the entry and exit pit locations shall be restored to original conditions. The Contractor shall comply with all permit provisions.

2. Pits constructed at the entry or exit point area shall be so constructed to completely contain the drill fluid and prevent its escape to the beach or waterway.

3. The Contractor shall utilize drilling tools and procedures which will minimize the discharge of any drill fluids. The Contractor shall comply with all mitigation measures listed in the required permits and elsewhere in these Specifications.

4. To the extent practical, the Contractor shall maintain a closed loop drilling fluid system.

5. The Contractor shall minimize drilling fluid disposal quantities by utilizing a drilling fluid cleaning system which allows the returned fluids to be reused.

6. As part of the installation plan specified herein before, the Contractor shall submit a drilling fluid plan which details types of drilling fluids, cleaning and recycling equipment, estimated flow rates, and procedures for minimizing drilling fluid escape.

PART 2:

2.0 DRILLING OPERATIONS:

A. General:

The Contractor shall prepare a plan to be submitted for Engineer approval which describes the noise reduction program; solids control plant, pilot hole drilling procedure, the reaming operation, and the pullback procedure. All drilling operations shall be performed by supervisors and personnel experienced in horizontal directional drilling. All required support, including drilling tool suppliers, survey systems, mud cleaning, mud disposal, and other required support systems used during this operation shall be provided by the Contractor.

Drill pipe shall be sufficient for the torque and longitudinal loads and fluid capacities required for the work.

A smoothly drilled pilot hole shall follow the design centre line of the pipe profile and alignment described on the construction drawings. The position of the drill string shall be monitored by the Contractor with the down hole survey instruments. Contractor shall compute the position in the X, Y and Z axis relative to ground surface from down hole survey data a minimum of once per length of each drilling pipe (approximately 10 m. interval). Deviations from the acceptable tolerances described in the Specifications shall be documented and immediately brought to the attention of the Engineer for discussion and/or approval. The profile and alignment defined on the construction drawings for the bores define the minimum depth and radius of curvature. At no point in the drilled profile shall the radius of curvature of the bore be less than 500 m. The Contractor shall maintain and provide to the Engineer, upon request, the data generated by the down hole survey tools in a form suitable for independent calculation of the pilot hole profile.

Between the water's edge and the entry or exit point the Contractor shall provide and use a separate steering system employing a ground survey grid system, such as "TRU-TRACKER / Digital Tracker" or equal wherever possible. The exit point shall fall within a rectangle 3 m wide and 12 m long centered on the planned exit point. During the entire operation, waste and leftover drilling fluids from the pits and cuttings shall be dewatered and disposed of in accordance with all permits and regulatory agencies requirements. Remaining water shall be cleaned by Contractor to meet permit requirements. Any modification to the basic drilling fluid involving additives must describe the type of material to be used and be included in Contractor's drilling plan presented to the Engineer. The Owner retains the right to sample and monitor the waste drilling mud, cuttings and water.

B. Environmental Provisions:

The Horizontal Directional Drilling operation is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to the adjacent creek or land areas involved during the construction process. The Contractor shall provide equipment and procedures to maximize the

recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy duty plastic sheeting with sealed joints to prevent the migration of drilling fluids and/or ground water.

The Contractor shall visit the site and must be aware of all structures and site limitations at the directional drill crossing and provide the Engineer with a drilling plan outlining procedures to prevent drilling fluid from adversely affecting the surrounding area.

The general work areas on the entry and exit sides of the crossing shall be enclosed by a berm to contain unplanned spills or discharge.

Waste cuttings and drilling mud shall be processed through a solids control plant comprised as a minimum of sumps, pumps, tanks, desalter/desander, centrifuges, material handlers, and haulers all in a quantity sufficient to perform the cleaning/separating operation without interference with the drilling program. The cuttings and excess drilling fluids shall be dewatered and dried by the Contractor to the extent necessary for disposal in offsite landfills. Water from the dewatering process shall be treated by the Contractor to meet permit requirements and disposed of locally. The cuttings and water for disposal are subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.

Equipment (graders, shovels, etc.) and materials (such as groundsheets, hay bales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by the Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps or spills.

Waste drilling mud and cuttings shall be dewatered, dried, and stock piled such that it can be loaded by a front end loader, transferred to a truck and hauled offsite to a suitable legal disposal site.

Due to a limited storage space at the worksites, dewatering and disposal work shall be concurrent with drilling operations. Treatment of water shall satisfy regulatory agencies before it is discharged.

C. Construction Plant and Equipment

(a) Where reference is made in this Preamble to items of constructional plant and equipment, it is to be understood that the percentage rate entered over the Bill of Quantities shall include all costs incurred in the provision, transportation to site, setting to work, operation (including all manpower fuel and consumable stores), maintenance and removal from the site upon completion

of the Works. The rates shall also include for the cost of all tests and other requirements in relation to such plant and equipment

(b) Contractor's specific attention is drawn with regard to the micro tunnel / HDD boring equipment to be used in the project. The Contractor shall carefully read relevant clauses in the Technical Specification and the requirements before selecting the micro tunnel / HDD boring equipment for the project. The Contractor shall provide adequate information on the tunnel boring machine he selected for the project with regard to its design capability for excavating the types of rocks/soil to be excavated in the project and its ability to micro tunnel / Bore through water charged mixed ground and rock/soil interface and hard basaltic rock. He shall also provide its operational history on similar rock/soil conditions and the description of the rock/soil including their geotechnical properties.

2.1 GENERAL SPECIFICATIONS FOR MICROTUNELLING AND PIPE JACKING METHOD

TERMINOLOGY AND GENERAL DESCRIPTION

2.1 Definitions

For the purpose of this contract document, the technical terms pertaining to microtunneling works and their functional details are defined below. The definitions herein are meant only as guidelines. If other (or new) definitions or technical terms are used by the Contractor in his submittals, they shall be clearly defined by him.

2.2 Microtunneling

Microtunneling is a process of accurately excavating, non-man entry tunnels for installing underground pipelines, using laser guided remote controlled mini shields of diameters 600-2400 mm. The microtunneling permits accurate monitoring and adjusting of the alignment and level (either manually or automatically) as the excavation proceeds.

2.3. Pipe jacking.

It is a process of lining a tunnel bore formed by a shield or other means by pushing especially designed jacking pipes (reinforced concrete or other pipes) into the tunnel bore, from a shaft (known as jacking shaft) to another shaft (known as receiving shaft).

2.4 Microtunneling and Pipe jacking:

It is an art of accurately installing smaller diameter pipelines (usually 600 mm diameter and above), without digging up of ground surface, using a laser guided remote controlled mini shields for tunnel boring and pipe jacking technique for lining the bore with the product pipe.

The process of installing a pipeline by microtunneling and pipe jacking system comprises five parts:-

- (a) Micro tunnel boring machine (Shields)
- (b) Automated spoil removal system
- (c) Jacking system for pushing the jacking pipe and later on carrier pipe as needed
- (d) Guidance system to guide the tunnel excavation
- (e) Remote control system to operate the shield and other paraphernalia equipment.

2.4.1 MicroTunnel Boring Machine (shield)

It is mechanised, steerable mini boring machine (or shield) equipped with suitable cutter head in front to excavate smaller diameter tunnels under controlled conditions in which the tunnel face and ground water pressure are continuously balanced as the shield excavates and moves forward. The operation and steering of the shield are remotely controlled with the aid of laser and/or CCTV system

2.4.2 Automated spoil removal system

This system conveys the excavated spoil from the tunnel face to the ground surface for disposal. The spoil removal rate and the speed of the shield are fully or semi-automatically controlled in such a way to achieve minimal heave or settlement. There are three systems available for the conveyance of the spoil and they are slurry system, augur system, and vacuum system.

2.4.3 Jacking System

The jacking system comprise high thrust hydraulic jacks mounted in a jacking frame capable of exerting the required jacking force against a purpose built thrust wall to push the pipes and the

shield forward through the ground. The jacking force is transferred evenly to the jacking pipe through a push ring connected to the pipe.

2.4.4 Guidance System

The guidance system comprises a laser beam device or a theodolite with laser beam attachment. The device is installed in the jacking shaft and the beam is set to the desired level, gradient and alignment.

Some machines have photo sensitive cells on the target panel located at the rear of the shield which converts the laser position into digital data. The data are then electronically transmitted to the operator's control panel where digital readout of the location can be made. Some modern shields have built-in capabilities to use the digital data and automatically make necessary steering adjustments to guide the machine to the true alignment and level

The contractor shall submit complete details of the guidance system he proposes to use and shall incorporate appropriate check points and hold points in the Quality Assurance Manual that he shall implement in the contract.

The laser torch or theodolite shall be firmly supported in the jacking pit so that it is independent of any movement that may take place during the microtunneling operation.

2.4.5 Remote Control System

All microtunneling systems rely on remote-control capability. The control system monitors and controls the steering of the shield, spoil removal system (slurry or auger or vacuum), jacking system and guidance system. The system operation varies from totally manual to fully automated. The remote control system is usually housed in portable control cabin.

The control cabin shall be located near to the jacking pit so that the operator can visually monitor the activities in the pit. Where it is not possible to locate the control cabin near to the pit due to space limitations, a CCTV camera system shall be set up in the pit to allow the operator to monitor the activities in the pit.

For the manual operating system, the operator's skill is very crucial for a successful completion of the project. The operator shall monitor all the information and continuously feed into the control panel as necessary. He shall be alert at all time and shall observe the crew's activities and other site activities, evaluate the information and make appropriate operational decisions. The information relayed back to the operator shall be audible, tactile and visual as The MTBM shall have facility to transmit sounds and vibrations from the excavation face to the operators to enable

him to make appropriate operational decisions. He shall monitor and keep record of position of the tunneling machine in relation to the design line & grade, cutter head face pressure & torque, jacking thrust, RPM, steering jack extension & their pressures, slurry pump flow rate, pressures of slurry systems, rate of MTBM advancement, Roll, Pitch, Installed length, Grout quantity etc.

In fully automated system, the machine acquires and evaluates the information and selects the operational steps for automatic steering of MTBM. The information collected shall be logged in a microprocessor to obtain a printout as necessary.

The contractor shall incorporate check points and hold points for the guidance control system in the Quality Assurance System that he shall implement in the contract.

2.4.6 Supplementary systems

The supplementary system required for microtunneling and pipe jacking operation shall include Muck disposal system, Pipe lubrication system, Grouting system, Guide rails, Entrance and Exit installations.

2.4.7 Jacking shaft (or Jacking Pit)

Jacking Shaft is an important temporary structure from where jacking operation is performed. The shaft is usually rectangular or circular in shape and built using liner plates, sheet piles or timber shoring. The size of the shaft shall be such that it is capable of accommodating the jacking equipment (and also the shield), jacking pipe and other paraphernalia or enable construction of Robohole or chamber as needed. The requirement for jacking shaft shall take full cognisance of the available working space and intended equipment footprint, minimum disturbance to the traffic flow.

2.4.8 Receiving shaft (Receiving pit)

A purpose built temporary structure to receive and remove the tunnelling shield after its completion of a tunnel drive. The shaft is also rectangular or circular in shape and smaller than the jacking shaft. The size shall be sufficient enough to accommodate the tunnelling shield when it emerges into shaft after completion of a tunnel drive or construction of Robohole or chamber as needed.

2.4.9 Footprint

The footprint of a microtunnel drive shall be taken as the net area occupied by the jacking or receiving shafts. The size of the footprint depends on many factors including the microtunneling

system and the length of jacking pipe used. The footprint requirement shall be an important factor, especially in congested and narrow roads when selecting the microtunneling system for a project.

The Contractor shall take into consideration of the space constraints and restrictions along the pipeline route for location of shafts and he shall ensure that the microtunneling system selected for use in such sites shall require absolutely minimum space for the footprint.

2.4.10 Thrust wall

Thrust wall is a temporary concrete or steel structure built within the jacking shaft to transfer the jacking force to the ground during jacking operation. The jacking shafts may often have more than a single thrust wall and each thrust wall shall be perpendicular and square to the pipeline to be jacked. The thrust walls shall be in good contact with the soils behind so that wall can transmit the jacking force effectively to the ground without affecting the shoring system.

All the affected thrust wall shall be demolished fully or partly after completion of jacking operation involving in that wall.

2.4.11 Entrance Ring

A steel flange fitted with a rubber seal (a 10mm to 20mm thick circular rubber gasket whose outside diameter is same as that of the steel flange and the inside diameter is smaller than that of the jacking pipe) installed perpendicular to the pipeline at the entrance. The purpose of the rubber seal is to prevent the slurry or ground water from entering into the shaft through the pipe entrance.

2.4.12 Exit Ring

This is similar to the entrance ring except that the internal diameter of the rubber seal is much smaller than that of the jacking pipe and is installed to prevent the slurry or ground water from escaping the tunnelling machine when it emerges at the receiving shaft.

2.4.13 Guide Rails (or Jacking Table or Frame)

To facilitate placing of the microtunneling machine and pipes in the jacking shaft, a set of guide rails are installed in position on the base of the shaft. The guide rail assembly (also known as jacking table/ frame) shall be carefully set up in the shaft to correct alignment and gradient so that the pipe when placed on it stays in line with and square to the pipeline alignment. The guide rail assembly shall be independent of the thrust wall so that it is not disturbed due to jacking force exerted onto the thrust wall.

2.4.14 Thrust Pressure Plate

The thrust pressure plate is usually a 50mm or 100mm thick steel plate installed between the jacks assembly and the thrust wall. The pressure plate enables the concentrated jacking load from the jacks to be transmitted evenly to the thrust wall,

2.4.15 Intermediate Jacking Station.

For longer distance jacking, intermediate jacking stations, comprising a telescopic type jacking pipe assembly (usually made of steel), are used. A set of inter jacks and push ring are installed around the inner side of the female pipe of the telescopic pipe assembly. The intermediate jacking pipe assembly shall be installed at appropriate point and jacked-in along with the other jacking pipes.

2.4.16 Cutter head

It is usually a disc shaped wheel mounted on the face of the micro tunnelling machine (shield) and is driven by hydraulic or electrical motor, located within the machine. The excavation capabilities of a microtunneling machine depends very much on the type of cutter head used, its size, its speed of rotation and average and peak torque etc.

Cutter head can be equipped with picks, single / double disk cutters, cone shaped cutters, button bits, chisel points, scrapers etc. with sufficient openings & buckets.

Different types of cutter head configuration are used in microtunneling machines to suit the type and nature of the ground through which tunnelling is to be carried out.. For example in soft ground tunnelling the cutter head shall have bits arranged in such a way to cleave and guide the soil into a chamber behind the cutter head through the openings provided in the cutter wheel.

In the case of rock or hard ground tunnelling the cutter head shall be equipped with suitable bits, roller bits or disc cutters for effective transfer of cutting energy to rock. The cutter head shall be configured appropriately considering geotechnical parameters such as compressive strength, tensile strength, elasticity, abrasivityetc, about the material to be excavated. The tunnelling machine shall be equipped with a crushing chamber behind the cutter head with powerful crusher to crush the excavated rocks into smaller pieces. Moreover, the machine shall be capable of exerting a large thrust force/torque on to the tunnel face to facilitate excavation of rock. The speed of rotation, torque, bit arrangement (and its structural and mechanical characteristic to withstand rock excavation for longer drive) of the cutter head and the thrust force the tunnelling machine is capable of exerting on to the rock face are important features to consider when selecting machines for tunnelling in rock.

2.4.17 Jacking Ring

Jacking ring or thrust plate is a purpose made structural fitting which shall be installed between the jacking assembly and the jacking pipe to transfer the point loads from the individual jacks into evenly distributed jacking force to the pipes being jacked. The ring shall be fabricated and machined, if necessary, so that it fits exactly onto end of the jacking pipe.

2.2. General Specifications for Horizontal Directional Drilling Method

2.2.1 DEFINITION

Horizontal directional drilling (HDD) has emerged as a preferred crossing method in many situations for the installation of oil and gas pipelines as well as other utilities under watercourses, roads, rail lines, steep slopes and other obstacles.

Recognition of the advantages, limitations and potential risks of HDD is an important step in this evaluation.

The successful design and construction of an HDD is the result of a team effort combining the skills of the regulatory group, owner, engineering consultant, environmental consultant, inspection services and the specialist HDD contractor. Success in this endeavor is measured in more than the successful pull back of the pre-built pipeline drag section.

18.2 DRILLING EXECUTION PLAN

The selected contractor should develop and present to the engineer a written drilling execution plan that addresses all aspects of the HDD. A full list of components of the plan is provided in Appendix C. Key topics in the plan include:

- Details of each step of the HDD;
- Detailed drawings;
- Equipment specifications;
- Workspace and water requirements;
- Monitoring plans including frequency and type; and
- Contingency plans.
-

18.3 ENVIRONMENTAL PROTECTION PLAN

An environmental protection plan (EPP) should be developed by the owner to address mitigative measures to be implemented during execution of the HDD. Environmental protection planning should cover all aspects of the execution of the HDD including land, water and access needs. The EPP should address the following aspects and be closely linked to the drilling execution plan:

- Notification and approvals;
- Identification of environmental exclusion areas to be incorporated into No Drill Zones;
- Environmental and social timing constraints;
- Equipment inspection and servicing;
- Clearing and grading of HDD sites and access;
- Erosion and sediment controls; and
- Monitoring.

In addition to having an EPP, it is essential to have qualified people onsite to enact the plan, to handle deviations to the plan and to report events properly to the authorities. Having an environmental specialist or biologist onsite to liaise directly with the DFO habitat biologist or other similar authority can prove useful. Effective communication of unintended events and subsequent mitigation actions to the authorities may reduce delays or unwarranted enforcement actions contingency planning, e.g., inadvertent returns and reclamation.

18.4 CONSTRUCTION CONSIDERATIONS

18.4.1 Drilling

18.4.1.1 Types of Rigs

The size of HDD rigs can vary substantially. This range in sizes should be considered when planning and developing specifications for an HDD project.

In general, rigs are sized according to their available pull force and rotary torque that can be applied to the drill stem and pipe string.

The capabilities of each rig should be assessed for each project. The assessment of rig capabilities should take into account the possibility that formations or other subsurface materials may be encountered that could cause difficulties with the HDD project.

18.4.1.2. Drag Section

The pipe installation should be designed so that, wherever possible, the pipe string or drag section can be laid out and pulled back in one continuous section.

The pipe will have to be lifted into place to match the exit angle of the drill to allow the drill rig to pull the section into place.

The pipe string is usually placed on rollers as it is pulled into the drilled hole. The drag section may be cradled through a vertical curve to achieve the proper angle at the exit point. This curvature should be no more than the limiting curvature of the pipe.

18.4.1.3 Steering / Survey of Drill Head

It is necessary to 'steer' the drill head or mud motor during the drilling of the pilot hole. A number of steering technologies are available.

18.4.1.4 Drilling Fluids

Drilling fluid is used for a number of tasks in the HDD process including:

- Cooling and lubricating the drill stem, mud motor and bit;
- Providing hydraulic power to the mud motor which in turn converts hydraulic power to mechanical power;
- Carrying cuttings out of the bore hole;
- Stabilizing the bore hole during the drilling process; and
- Sealing fractures in the formation.

Drilling fluid is usually a mixture of freshwater and bentonite. Bentonite is naturally occurring clay that is extremely hydrophilic (i.e., has high swelling characteristics). Certain polymers may also be used that enhance the drilling fluid benefits.

A drilling fluid design plan should be established before the start of the project. This plan should also be modified, when warranted, throughout the project to ensure the drilling fluid is fulfilling its function.

The contractors' drilling execution plan should identify the equipment to be maintained onsite to check drilling fluid properties. Alterations to the mix should be made, when warranted, to stay within the proposed boundaries in the drilling fluid management plan.

A mud handling system should be onsite to ensure drilling fluid parameters are within the set standards.

Additives

Various chemical and materials can be added to the drilling fluid to adjust its properties. This is done to control:

- Density;
- Viscosity;
- Plugging and sealing capabilities; and
- Specific conditions such as swelling.

All additives should be environmentally safe. A number of additives have been recognized as safe for the water well drilling industry and, with the proper approvals, could be used for the HDD industry. All additives must be approved before use.

18.4.2 Monitoring

Monitoring and reporting are critical during an HDD since they provide a log of activities during the process to:

- Provide early identification of issues;

- Make appropriate changes;
- Provide a basis for mitigation; and
- Provide a record of decisions and actions to demonstrate due diligence.

It is important to ensure that sufficient records are maintained before, during and after construction to support subsequent reports prepared to satisfy engineer or government reporting requirements. This should include detailed notes and photographs of all areas monitored.

18.4.2.1 **Drilling**

The following monitoring and reporting activities should be reviewed for appropriateness for the size and complexity of the HDD crossing:

- Inspector daily records – a day-to-day account of the entire construction of the project;
- Contractor drilling records;
- Steering report;
- Drilling fluid volume balance report;
- Drilling fluid parameters;
- Drilling fluid additives list;
- Annular pressure modeling and reporting;
- Turbidity monitoring report;
- Surface monitoring report;
- Pull force monitoring; and
- Inadvertent return report.

18.4.3 **Contingency Plans**

18.4.3.1A site-specific contingency plan should be prepared by the project team for each HDD. A well designed contingency plan should address the following:

- General measures;
- Equipment and personnel needs for containment and clean-up;
- Emergency response procedures;
- Plans for continuance of drilling or alternative plans;
- Time lines of acceptable response and notification;
- Clean-up methods and plans;
- Regulatory and stakeholder contacts;
- Monitoring plans; and
- Disposal plans.

4.3.2 Clean-up and Remediation

An important decision may be required when plans to be prepared to clean-up an inadvertent release of drilling mud. The decision can involve determination of whether or not clean-up and reclamation of a site will incur greater adverse effects on the environment than leaving the mud *in situ* and allow natural processes to reclaim the area.

Clean-up

It is important for the, contractor to submit cleanup goals for a site subjected to an inadvertent release of drilling fluids prior to commencement of clean-up activities. If a net gain is not anticipated as a result of clean-up, alternative measures may need to be implemented.

18.4.4 Reporting

18.4.4.1 Monitoring Reports

Prior to the start of construction, the contractor should be required to provide the proposed monitoring report forms as part of the drilling execution plan. Frequency and types of monitoring should also be presented in the drilling execution plan.

18.4.4.2 As-Built Reports

As part of project deliverables, the contractor should provide the engineer an as-built drawing in a format approved or determined by the engineer. The contractor should also provide a set of the monitoring reports at the end of construction.

PART 3:

PERFORMANCE REQUIREMENTS AND SITE RESTRICTIONS.

3.1 Design Life.

For the purpose of designing the pipelines and the associated structures, the design life shall be 80 years. The materials incorporated in the works and the workmanship shall be of required quality to sustain the specified life span.

3.2. Level and Alignment Accuracy

The pipes shall be installed into place, true to line and level. The maximum tolerance allowable in the displacement of the centreline of the laid pipe from the design centreline is 50 mm in the horizontal plane and 25mm in the vertical plane but there shall be no back fall at any point.

There shall be provision to prevent the relative movement between pipes at the joints by the use of steel gaiters or other approved methods during jacking operation. A packing piece of compressible material shall be provided at each joint and shall be securely held before the pipes are lowered into the thrust pit. Details of proposals shall be submitted to the Engineer for approval.

3.3 Limits on ground settlement and upheaval

For the sections of pipeline crossing under nallas, roads and railways etc. the Contractor shall be required to incorporate in his tunnelling method measures to arrest the expected settlements so as to safeguard the integrity of the road surfaces, railway tracks and collapse of nalla bed. The Contractor shall ensure that the traffic flow along the roads is not affected in any way as a consequence of his work.

3.4 Limitation on Footprint:

The contractor shall be deemed to have visited the sites and carefully planned and located the shafts at convenient points along the roads so as to minimize the road area to be occupied by the footprint considering centre to centre distance of Roboholes. The contractor shall be deemed to have allowed for such site constraints and measures required, including working in the night and construction of decking over the shafts, provision of access roads for construction plant and machinery, to allow the traffic to flow, in his rates. He shall take the site constraints and restrictions into consideration when selecting the trenchless technology system.

3.5 Proper scheduling of operations:

It must be noted that the objective of the work is to

- (a) Upsize the existing sewer line and also to provide alternative sewer line at a higher depth to increase the sewerage flow capacity.
- (b) Failure to ensure proper time scheduling by the contractors may lead to delays or total inability in taking up the work on further pipe lines. Such delay or inability shall be entirely attributable to the Contractors.
- (c) Providing connections as and when directed by the Engineer / User department.

Part 4

CONTRACTOR'S SUBMITTALS

4.1 General information on submittals.

To ensure compliance with the requirements specified in the Contract, the contractor shall make a number of submittals as described in the following clauses to the Engineer for approval by the specified time. The contractor shall ensure that the submittals prepared are of good professional standard, comply with all the requirements specified in the contract and complete with all details and information to enable the Engineer to evaluate and approve the submission. It shall be clearly understood by the contractor that he shall not commence any work without the approval of the submittals by the Engineer.

Submittals by the contractor shall, inter alia, include Contractor's method of construction, Microtunneling equipment description and literature, Jacking system and maximum jacking loads, Pipe designs and shop drawings and calculation demonstrating the ability to sustain maximum jacking loads, Intermediate jacking stations details, Lubrication system, Bentonite injection system details, Ground water control details, Entry and exit details, Jacking and receiving shaft design details, design & details for shoring of shafts, Thrust block design details, Muck removal and disposal, Horizontal Directional Drilling Equipment, buried services details, detection equipment or any other trenchless technology system equipment, etc.

All submittals shall be submitted by the Contractor in accordance with schedule given in 4.17.

4.2 Submittal on Contractor's method of construction

The submittal shall contain a detailed explanation of various steps involved in the construction process. They shall include details of the equipment, specific manufacturer's instructions and guidelines pertaining to the project, a methodology statement outlining the operation of the

equipment and, details of materials including pipe materials, rubber ring, and compressible packers and jointing of pipes.

The submittal shall also include construction details of other permanent and temporary structures such as jacking and receiving shafts, cast in-situ and precast Roboholes, or brick masonry Roboholes, thrust walls, and entry and exit of the shaft. The details of other equipment such as intermediate jacking stations, spoil removal system including slurry and feed pumps, control systems, slurry tanks and associated machinery, jacking frames, spacers, thrust ring etc shall also be included in the submittal.

The submittal must accompany the bid failing which the bids shall be considered 'non-responsive' and rejected outright.

4.3 Submittal on geotechnical profile and geotechnical reports along the pipeline route.

The Contractor shall establish the subsurface ground conditions and their range of variability along the pipeline before embarking on the works. He shall clearly identify the types of soil or rock that is likely to be encountered during boring or tunnelling along the entire pipeline alignment. If found necessary he shall carryout simple probing techniques (Geophysical soundings or Seismic refraction method) at closer interval and determine accurately the types of ground to be expected during boring/ tunneling.

He shall prepare a comprehensive geotechnical profile along the pipeline route with detailed descriptions of the types of soil or rock to be expected during boring/ tunnelling.

The Contractor at his own cost shall carry out essential geotechnical investigations and tests (Field as well as laboratory) immediately after award of the work for enabling him to select appropriate equipment/ methods and to design the cutter head; for which no extra payment shall be admissible in this regard. The Contractor shall be solely responsible for geotechnical investigations and the inference drawn from such investigations as well as the adequacy of the equipment and method adopted by him. However, other progress of works like construction of shafts etc. may be continued simultaneously.

4.4 Submittal on jacking pipes design.

The contractor's attention is drawn to the requirement pertaining to the design, manufacture and handling of the jacking pipes in clause 5.3.

The contractor shall with the approval of the Engineer, engage a reputable pipe manufacturer to design and manufacture the jacking pipes. In which case, the submittal shall include the

manufacturer's name, address, contact telephone and facsimile numbers and the manufacturer's quality assurance /control and testing plan for the jacking pipe. The manufacturer's representative's name shall be also included in the submittal. A dimensioned drawing of the jacking pipe with design calculations from the manufacturer shall be also submitted to the Engineer for approval.

In case the Contractor intends to manufacture the pipes in his own facility set up for this purpose, he shall submit all details of equipment, design and process to the Engineer for approval.

The pipes shall conform to latest versions of respective BIS standards and shall be fabricated with approved materials in case of MS pipes or shall be procured from a manufacturer having facility with BIS certification.

4.5 Submittal on microtunneling /HDD system.

The bidder / contractor shall furnish name of the microtunneling / HDD model, manufacturer's technical literature for the equipment and all other data along with their bid. Any amendments deemed necessary by the Contractors shall be submitted along with the geotechnical profile within 3 days of submission of geotechnical profile to BMC. The submittal shall include information to ensure that the microtunneling equipment proposed for the project meet with the general requirements specified in these specifications and also the anticipated geological conditions as assessed by the contractors. The submittal shall also include a certification from the manufacturer of the equipment about adequacy in the anticipated geotechnical conditions as also design calculations showing maximum anticipated jacking or pullback force and torque needed for tunnelling/ boring.

4.6 Submittal on site layout.

Contractor's attention is drawn to various clauses in the document with regard to the site constraints and space availability in all the sites. The contractor shall carefully examine the site and prepare site layout plans showing the arrangement of various ancillary equipment required for works, such as approaches for equipment, spoil removal equipment and slurry tanks, Bentonite systems/ mud recycling system, generators, control cabin, tracking facilities, crane, storage of pipes etc for each drive and submit them progressively to Engineer for approval.

4.7 Submittal on existing pipe levels, location of shafts and new pipeline alignment.

The contractor shall survey and verify the as-built invert levels of the upstream and downstream pipelines and Roboholes shown on the contract drawings for all the sites. The contractor shall confirm or insert the correct as-built levels in the contract drawings and submit them to the

Engineer for necessary amendments and re issue of the contract drawings for construction. Under no circumstances the contractor shall commence works without verifying the as -built levels and obtaining the approval of the Engineer.

The Contractor will be required to set out and plan the actual route for the pipe laying well in advance of actual excavations. Trial holes/ probing and other preliminary surveys must be carried out and the resulting information carefully plotted. A copy of all preliminary surveys and the results of exploratory excavations must be supplied to the Engineer.

For convenience of construction, if the Contractor prefers changes to the pipeline alignment or the location of Roboholes shown on the contract drawings, he shall incorporate such changes in his submittals to the Engineer for approval. The Engineer would evaluate and approve if the proposed changes are found to be economically and technically, and functionally acceptable. It shall be clearly understood by the Contractor that any construction risks and additional costs arising as a result of Contractor's changes made to the original pipeline design shall be entirely borne by the Contractor.

4.8 Submittal on jacking and receiving shaft design

The Contractor shall submit the design and construction details of the jacking and receiving shaft and their proposed locations along the pipeline route to the Engineer for approval. The Contractor's design shall ensure that the shaft dimensions are absolute minimum required and method of construction shall be such that the shafts are constructed without causing unacceptable obstruction to the existing traffic flow in the vicinity of the construction. The minimum size of the shaft shall, however, permit construction of appropriate Robohole / valve chambers as per the requirements. The Contractors shall also submit design and construction details of decking, if required, for the shaft. The Contractor shall be deemed to have allowed for in his Bid for such decking work necessary to maintain the traffic flow.

The submittal shall also include design & details on shoring system, entry and exit arrangement, thrust wall layout and its design details, general layout of guide rail and jacking table arrangement etc.

4.9 Submittals for obtaining approval from authorities

The contractor shall submit separate schedule for obtaining approval of various authorities and obtain specific permission or approval through the engineer. The Contractor shall be responsible for obtaining permissions from traffic police, PWD, MMRDA and Railway authorities with due regard to the method of work and detailed designs involved. The contractor shall be responsible

for submission of the detailed designs and clarification on time to the concerned authorities. The Employer shall arrange to pay for the way leave charges or supervision charges only as demanded by railway, PWD and any government authorities.

4.10 Submittal on buried services and obstructions

The contractors shall investigate and determine the actual location of the buried or over the ground services and physical obstructions, if any, along the pipeline route and at his chosen locations of the jacking and receiving shafts, and submit service location drawings to the authorities responsible for electricity, telecom, water, pipeline, gas etc and obtain their approval or permission to excavate in their vicinity.

The Contractor shall not interfere with the operation of any existing or proposed service. He shall carefully plan the pipeline route and the locations of the shafts and Roboholes and shall identify the services that require diversion well ahead so as to give ample time to the authorities to divert the services or give approval to carry out the diversion by others. Where applicable, the Engineer would assist the contractors in getting the approval as expeditiously as possible from authorities.

If in the opinion of the Engineer any services that are within the Robohole proper or affecting the alignment and require permanent diversion, they shall be diverted at the expenses of the Corporation. Expenses for all other diversions and temporary protection of services shall be borne by the Contractor.

Any consequential delays or expenditure arising from Contractors' carelessness or lack of foresight on this matter shall be entirely borne by the Contractor.

The Contractor shall fully co-operate with the Engineer and the authorities and shall have no financial claim for delay due to such relocation of services.

The Contractor shall allow for sufficient time for getting the permissions from the authorities.

4.11 Submittal on monitoring of ground settlement and upheaval

The contractor shall monitor ground movement daily at the start of jacking operation, at the end of the jacking operation and during the jacking operation on that day and submit in an approved format the settlement or upheaval caused by the microtunneling and pipe jacking works to the Engineer.

4.12 Submittal on safety

The Contractor shall be solely responsible for safety of the workmen, Engineer's staff and third party. The contractor shall implement a comprehensive safety plan for his work people and Engineer's/ Employer's staff or Third party. He shall comply with all relevant acts governing safety on construction site. He shall submit to the Engineer the details of the arrangements he made with the fire brigade, local health authorities and the availability of medical staff, first aid equipment ambulance, sick bay etc. He shall give the names and contact telephone numbers (24 hours) of the occupational health and safety personnel. Beside he shall submit a list of safety equipment that he would provide to all the workers on site. The Contractor shall appoint a Safety Officer or Safety Engineer at all times who shall be the responsible person for all safety related matters pertaining to the contract. Name of such person shall be communicated along with the submittals on safety. The contractor shall comply with the guidelines issued by any competent authority regarding safety at work site especially safety of persons working inside any pipeline-new or functioning. The Contractor shall provide & maintain proper signboards, warning lights, beacons, barricades, lighting, fencing etc. at sites. Any accident/ mishap arising from the non observing of safety measures will be sole responsibility of contractor.

4.13 Submittal on quality assurance/control plan

The Contractor shall implement a Quality Assurance Program approved by the Engineer for the manufacture of jacking pipes and for actual installation of the pipes by microtunneling and pipe jacking method on site.. The Quality Assurance Programme shall be maintained in accordance with the provision of the manual. No works shall commence until the Quality Assurance Manual has been approved by the Engineer.

The Contractor's Quality Assurance System shall incorporate but not be limited to the following:

- (i) The Quality Assurance and Quality Control procedures covering all materials, design, manufacture, supply and installation carried out by the Contractor and any of his sub-contractors.
- (ii) Such tests necessary to demonstrate that materials comply with the requirements of this specification and the requirements of the relevant Standards and Codes.
- (iii) Contemporary records to be maintained pertaining to progress of the work.

4.14 Submittal on Contractor's personnel

The Contractor shall appoint a dedicated Project Manager along with at least two dedicated site engineers experienced in microtunneling work for this contract.

The contractor shall note that the skill of MTBM operator and their assistants is crucial for successful execution of work. The contractor shall submit complete information for the operators proposed to be employed for the work.

The contractor shall submit a list of his key site staff including their CV to the Engineer along with the bid. No change in the personnel shall be permitted subsequently without written permission of the Engineer. He shall submit the diagram showing the communication link within the site to Contractor's Head Quarters along with designation and telephone numbers of key staff for the Engineer's record. The Engineer reserves his right to reject any person who he thinks not suitable for the contract and the Contractor shall be obliged to replace such person immediately.

4.15 Submittal on remedial measures to be adopted by the Contractor.

The Contractor shall take each and every precaution to ensure that the tunnelling or drilling equipment will successfully excavate along the chosen pipeline alignment before he commences the operation. Once the tunnelling/ drilling is commenced in a drive, the Contractor will be held fully and wholly responsible for the successful completion of the tunnel excavation and retrieval of the shield from the receiving shaft or for completion of pilot bore and hole enlargement upon back-reaming. In the event of inability to complete the drive, due to machine break down, non-favorable geology or any other reasons, the Contractor shall be fully responsible to recover the equipment safely from the ground and restore the incomplete work to the original condition at his risk and cost by a method approved by the Engineer and the concerned authorities within time stipulated by the Engineer or the concerned authority.

It shall be clearly understood by the Contractor that the occurrence of such an event is preventable as such an occurrence is generally due to Contractor's negligence in the "preventive maintenance" of the equipment or driving of it to true level and gradient or his failure to determine accurately the expected ground conditions before commencement of the excavation.

The Contractor shall in his submittal clearly state the measures that he would implement to retrieve the shield without causing interruptions to railway or road traffic etc and without causing any damage to the property belonging to the PWD or Railways/ BMC etc. The cost for such retrieval measures or any consequential expenditure or delays arising from thereof shall be entirely borne by the Contractor. Any failure to remedial measures shall be entirely at the risk and cost of the Contractor.

Any abandoned hole or tunnel must be grouted completely at the Contractor's cost so as to prevent subsequent settlement.

4.16 Effect of Approval and Acceptance of Proposals

Approval or acceptance by the Engineer of any proposal for executing the Works, including drawings, specifications or resources employed under the Contract shall not relieve the Contractor of his responsibility for any errors thereon and shall not be regarded as an assumption of risk or liability by the Corporation. The Contractor shall have no claim under the Contract on account of the failure or partial failure or inefficiency of any plan, method of work or equipment approved or accepted by the Engineer. Such approval or acceptance shall be considered to mean only that the Engineer had no objection to these proposals.

Notwithstanding any approval or acceptance by the Engineer, the Contractor shall remain fully responsible for completing the Works correct in every detail.

4.17 Schedule of submittals

Sr. No	Clause Number	Description	Schedule of submission
1	4.2	Contractor's method of construction.	Along with the e-tender
2.	4.3	Geotechnical profile along pipeline route.	Within 30 days of commencement date.
3.	4.4	Jacking pipe design	Along with the e-tender.
4.	4.5	HDD System.	Original submission along with the e-tender and any changes necessitated by the geotech investigation shall be submitted within 7 days of submission of geotech profile.
5.	4.6	Site layout	Within 14 days of commencement date.
6.	4.7	Existing pipeline levels, locations of shafts and new pipeline alignment.	Within 14 days of commencement date.
7.	4.8	Jacking & Receiving shaft design.	Along with the e-tender. Any changes necessitated by the geotech investigation shall be submitted within 3 days of submission of geotech profile.
8.	4.9	Approval from authorities.	Within 14 days of commencement date
9.	4.10	Buried Services & obstructions.	Within 14 days of commencement date
10.	4.11	Monitoring of Ground settlement & up heavel.	Along with the e-tender

11.	4.12	Safety.	Along with the e-tender
12.	4.13	Quality assurance/Central plan.	Along with the e-tender
13.	4.14	Contractors Personnel	Along with the e-tender
14.	4.15	Remedial measures.	Along with the e-tender

PORTAL COPY

Part 5

Products

5.1 Standards and Codes

Except as otherwise stipulated in this Specification and in the BMC's Standard Specifications, all materials and workmanship shall comply in all respects with requirements of such standard and specifications, codes and other standards issued by the Bureau of Indian Standards (BIS) and current at the date of bid as may be applicable to any part of the Works of this Contract. In the event there being no relevant Indian Standard Specification, other relevant standard, specification, current at the date of bidding such as the British Standards Institution, American Society for Testing Materials (ASTM), German Standards (DIN), Japanese Standard for Water and Sewerage (JSWAS), Standard Association of Australia (AS), or Singapore Standards (SS) and or of the or any other equivalent standard approved by the Engineer shall apply. If after the date of invitation to Bid there is an amendment to a standard specification relevant to the Contract, the Engineer will direct whether the amendment is to apply.

In the event of there being any conflict between this Specification, the Drawings and any Standard Specification forming part of this Contract, this Specification shall take precedence over the drawing, BMC's Standard Specification, codes and other standards in that order of precedence.

5.2 Selection of Microtunneling Equipment

The contractors shall be responsible for the selection of a suitable micro tunnel boring machine capable of excavating the materials including hard rocks, soil and mixed ground that may be encountered at the sites.

The contractor shall ensure that geological and geotechnical information he obtains or possesses for the site is adequate to accurately determine the types of soil and rock that may be encountered during execution of the project. The contractor is deemed to have carried out sufficient geological and geotechnical investigation of the sites and testing of the soil and rock (to determine compressive strength, tensile strength, abrasivity, cuttability, mineral make up of the rock etc as may be necessary to determine the ability to successfully tunnel through the ground) as necessary at his own cost before the selection of the microtunneling system.

The contractor shall also ensure that the microtunneling system he selects for the project shall successfully excavate in the wide ranging ground conditions from clayey and sandy strata with boulders and loose / fractured rocks to very hard rocky strata including mixed face conditions, that may be encountered at the sites.

Contractors shall pay particular attention, when selecting the tunnelling equipment for the project, to ground water level fluctuation and the wide ranging subsurface soil strata from clays, sands, gravels, soft soils with boulders and loose rocks to basaltic hard rock that may be present at the sites. The tunnelling equipment selected for the project shall have appropriate cutter head equipped with suitable cutter bits to excavate soils and rock below the water table.

The tunnelling equipment shall be capable of balancing the ground water pressure supporting the excavated tunnel face at all times. The equipment shall be articulated to enable remotely controlled steering, in both the horizontal and vertical directions. It shall be capable of preventing rotation and rolling movement of shield's body during the drive. The tunnelling equipment shall, interalia, have the following features.

- (a) Able to excavate and crush very hard rock formations, loose rocks, boulders of unconfined compressive strength in excess of 350 Mpa with no requirement for replacing the cutter head or bits and other components when geological and geotechnical conditions change during a drive. The compressive strength mentioned above shall not be construed as the maximum anticipated and the contractor shall be solely responsible for selection of appropriate equipment. The MTBM shall be able to cut through rock having high tensile strength, elasticity, hardness and abrasivity.
- (b) Capable of providing positive face support and capable of controlling heave and settlement by proper operation to acceptable tolerances.
- (c) Powerful cutter head, capable of exerting large and/or surging torque to break up rocks and boulders.
- (d) Powerful crushing force, preferably with eccentric radial motion of the crushing device, capable of crushing gravel, boulders and rock.
- (e) Equipped with suitable steering and guidance system that ensures easy steering control and articulated to enable controlled steering in both directions.
- (f) Equipped with a suitable lubricating system arrangement for injecting lubricant around the exterior of the pipe being jacked.
- (g) Ability to provide for an Intermediate Jacking Station, if needed.

- (h) Capable of controlling rotation
- (i) Instrumentation to measure deviation from the designed level and grade, rolling and pitching of the equipment, cutter head torque and its percentage to the maximum torque, rpm, jacking thrust, jacking speed, tunnel face pressure, steering jack extension & their pressures, slurry pump flow rate, pressures of slurry systems and rate of advancement, Installed length etc. preferably with a computerised data logging and printing facility.

The microtunneling equipment proposed for the project shall meet the above mentioned criteria or otherwise it will not be permitted to use in the project.

5.3 Concrete Jacking Pipe (NP- 4 Class& Above)

The pipes for jacking operation may precast reinforced concrete pipes or other approved pipes. The concrete jacking pipes shall be manufactured by a centrifugal or vertical casting process to be approved by the Engineer. Design, manufacture and factory testing of the pipes and specials shall be to A.S. 1342 or S.S 183 or JSWAS A-6-1989/A-2-1973, ASTM C76M or other acceptable standard and shall also meet the basic requirement specified in I.S 458 & I.S 3597 or its equivalent standard as amended up to-date . The clear cover of concrete over steel reinforcement on the wet face shall not be less than 50mm.

The outside and inside diameters of the pipe shall be such that they match the dimensions of the tunnelling equipment or vice versa. The standard length of the pipe shall be 2.5m. However the length of the pipe shall be shortened if desired by the contractor to suit the site conditions subject to the Engineer's approval.

Precast concrete pipes, if manufactured locally by the Contractor, shall be manufactured using Batch Mix Concrete of required grade. Complete details of the Batch of concrete like its Grade, WC ratio, maximum aggregate size, additives shall be maintained for each batch. Six cube samples shall be taken from each batch and tested for 7 & 28 days compressive strength in a laboratory situated at factory or any institution approved by the Engineer. If the tested cubes fail the requirements, the finished pipe shall be liable for outright rejection after confirmation from NDT test results.

The Engineer's representative shall have full authority to inspect any material or finished product and reject the same if not found conforming to the standards. The Contractors shall make his representative available to the Engineer's representative during such inspections and testing failing which the Engineers representative shall be at liberty to take ex-party decision which shall become binding upon the Contractor.

The pre-cast reinforced concrete pipes shall be sufficiently reinforced with steel to withstand all stresses induced by handling, jacking, earth and water pressures and all working loads at the depths at which they are to be used without cracking, spalling or distortion. The pipes shall be of at least strength Class NP4. A load factor (for the maximum jacking force) of not less than 2.0 shall be used in the calculations to determine the strength of the pipes required. The strength of the pipes shall be tested by the three edge bearing test. When subjected to the design load in such a test, the load required to produce the crack width of 0.25mm on the pipe shall be in accordance with IS Code 458. All such tests shall be carried out at the expense of the Contractor at pipe manufacturing unit or any other institution as suggested by the Engineer and Engineer's representative will witness the test. The frequency of the Three Edge Bearing test shall be at least once in 3 months or every 75 pipes or part thereof for each diameter.

When designing the jacking pipes, the contractor shall take into consideration jacking load, pipe stiffness, corrosion resistance, flexibility, durability, joint efficiency etc. The Contractor shall submit full details of his proposals for the pipes, giving detailed drawings showing sizes, reinforcement and type of joints, calculations, together with the name of the proposed manufacturer, the place of manufacture and the manufacturing process to the Engineer for approval along with a consent letter from manufacturer of the pipes from such manufacture. All workmanship and materials used in the manufacture shall be subject to the approval of the Engineer who shall be authorized to inspect materials at source and the manufacturing processes in the factory at any time.

Contractors shall allow for eccentric loading in the pipe, rather than an axial loading, during the installation of the pipe. The Contractor shall take precautions to minimise the resultant pipe stresses in a jacking pipe and to achieve a trouble free jacking operation. The eccentric loading shall account for maximum steerability.

The contractor shall make provision in contract either to manufacture for jacking pipes, in Mumbai as per specifications or procure them suitably. He shall provide information on contractors jacking pipe manufacturing or procurement capability along with his bid. In case of procurement from manufacturer, the contractor shall allow sufficient time for import & clearance of the consignment from various authorities and delivery to the site as applicable.

- (a) Pipe shall be straight and uniform with square ends. The joints shall be well formed to allow efficient transfer of jacking load from pipe to pipe.
- (b) Pipe joint shall be fitted with compressible packer for better distribution of jacking load.

(c) The jacking frame, jacks and steering head shall be properly aligned along the designed alignment and grade and the whole assembly shall be square and at right angles to the thrust wall. Steering corrections shall be made gradually to minimise abrupt misalignment angles between the pipes.

The pipes should be provided with well-formed arrangement for groove for rubber gasket.

The pipes which are to be used in the construction of the works shall be sufficiently cured before they are brought to the site of the Works. They shall be handled with extreme care to prevent the edges of the pipes from chipping. The pipes shall be stacked in shade or adequately protected from severe sunrays. The Engineer may reject any pipes he considers not suitable for the Works and these rejected pipes shall be removed from the site immediately. After factory testing and before despatch, every pipe shall be marked in accordance with the Standard used. In addition, each pipe shall be marked with a number corresponding with the order of manufacture and date of manufacture and Grade of Concrete. Test certificates from the manufacturers or other relevant authority shall be submitted to the Engineer.

Some of the sites may have limited or restricted storage space for stacking of jacking pipes. The Contractor shall therefore schedule the supply of pipes to the sites in such a way that only absolute minimum numbers of pipes are brought to the site at a time.

5.4 Pipe Joints

The jointing arrangement for the jacking pipes is crucial in terms water-tightness, flexibility and smooth transmission of jacking force. Spigot ended jacking pipe with recess to receive rubber rings and steel or stainless steel couplings (collars) or other acceptable joints shall be used in pipe jacking application. The spigot and socket joints shall be flush from outside as well. The contractor shall submit joint details to the Engineer for approval.

5.5 Rubber ring joints

The joint rubber rings supplied and installed shall be of the Cornelius rubber ring type or similar approved and shall be capable of accommodating 2 degree deflection at each joint. Joint rings shall meet with the latest edition of I.S. 5328 and B.S. 2494 part 2 or be of approved quality by the Engineer. The properties of the joint ring shall be between those specified in BS 2494 for grade D and grade B.

The testing of rubber ring shall conform to IS. 3400 and also IS. 5382.

The Contractor shall indicate the grade of rubber rings he intends to use and submit samples for approval prior to incorporation in the Works. The grade, type or source of supply of rubber rings shall not be changed without the written approval of the Engineer.

5.6 Pipe Couplings (Collars)

Where pipe couplings (collars) are used for pipe joints, it shall be made of weldable structural steel top BS 4360 Grade 43 or equivalent I.S. The steel coupling shall be of such dimension and thickness so that when inserted into the pipe, it fits exactly into the recesses in the pipe. The joint so formed shall be watertight. The joint details shall be approved by the Engineer. Before fitted to the pipes, the collars shall be coated with approved anti-abrasive and anti-corrosive materials such as polymorphic resin or other materials as approved by the Engineer. However, all collars in case of works across railway tracks shall be of stainless steel only.

5.7 Compressible packers.

Suitable compressible packers shall be used at the joints for distributing the jacking force evenly through the wall of the jacking pipes. Uneven transfer of jacking force from a pipe to another will result in concentrated and excessive stresses in the pipe which can cause the pipe to crack. Contractor shall submit details of the compressible packers for Engineers approval.

5.8 Identification of pipes, rubber rings etc

Every pipe made shall be clearly and indelibly marked upon it an identification number, class, batch of concrete, diameter and date of manufacture. Every finished pipe shall be tested for dimensional conformity and non-destructive testing with Schmidt Hammer or any other method as approved by the Engineer. Full records are to be maintained of each pipe test and for each individual pipe the date manufactured, cleared after testing and supplied.

If the pipes are to be procured from a manufacturer, the Contractor shall make arrangements for visits of the Engineer's representatives for inspection and testing as and when deemed necessary by the Engineer. All expenses in connection with such visits shall be borne by the Contractors. After the satisfactory completion of testing and approval of the pipes by the Engineer the pipes shall be stored at factory premises during the period awaiting delivery.

No pipe shall leave the manufacturer's yard for the site unless it is tested.

5.9. All works to be water tight

(a) The drains, Roboholes and all joints of pipes must be made thoroughly sound and water tight, and any joint which may be proved to be leaky at any time during the progress of the works

or during the contractors' subsequent period of maintenance shall be immediately made sound by the contractors at their own expense. The contractors, when required by the Engineer shall at their own cost prove all works to be water tight by filling it with water to such height as the Engineer may determine. Any additional precautionary measure or appliances that may be found necessary to ensure the water tightness of the Roboholes, flush tanks, disc plug in junctions and the joints of pipes shall be adopted by the Contractor without extra charge, the responsibility of making them completely water tight resting upon the contractors.

(b) Immediately after the test with the double disc or cylinder as mentioned in clause No. 7.5.9 (a) has been completed and any defect hereby disclosed have been made good the Contractor shall prove the joints of the stretch of under-ground pipes whether of stoneware, cast iron or R.C. Pipes, to be water tight by filling in pipes with water before filling in the trench to the level of 1.50 M above the top of the highest pipe in the stretch and heading the water up for the period of one hour or such further time as the Engineer may direct. The apparatus used for the purposes of testing shall be approved by the Engineer. The contractor if required by the Engineer shall make the excavation dry and keep it so during the period of testing. No test applied to part of a stretch of pipes shall be considered conclusive nor shall it be deemed to obviate the necessity of an application of the test to the whole of stretch when completed. The loss of water over a period of 30 minutes should be measured by adding water from a measuring vessel at regular 10 minutes and noting the quantity required to maintain the original water level. For the purposes of this test the average quantity added should not exceed 1 litre/hour/100 linear metres/10 mm. of nominal internal diameter (0.2 gallons/hour/100 linear feet/inch of nominal internal diameter.

Any leakage including excessive sweating which causes a drop in the test water level will be visible and the defective part of the work should be removed and made good.

The Roboholes when they have been raised above the highest subsoil water level expected in the monsoon shall similarly be tested for water tightness as for the pipe lines. The procedure for this shall be as follows:-

The mouths of all pipes entering the Robohole shall be suitably plugged with brick, masonry or wooden or any other type of plug. The Robohole under test shall then be filled with water upto the general sub-soil water level and observed for a period of one hour. If the level does not drop by more than 50 mm. in one hour it shall be assumed that the Robohole is water tight.

During the period of the test the outside trench shall be kept free from any accumulation of subsoil water in case of a drop of more than 50 mm in the water level the contractor shall note the places from where the leakage is taking place & take steps to stop the leakage.

For R.C. pipes having diameter 1200 mm or more thorough visual inspection of inner side of pipe shall be carried out with a trained eye.

(c) Cleaning of the pipes

As soon as a stretch of pipes whether of stoneware or Cast iron or R.C. Pipes has been laid complete from Robohole to Robohole, the Contractor shall run through the pipes both backwards and forwards a double disc or solid or closed cylinder 75 mm. less in diameter than the internal diameter of the pipes. The open end of an incomplete stretch of pipe line shall be securely closed as may be directed by the Engineer to prevent entry of mud or silt etc.

(d) If as a result of the removal of any obstruction the Engineer considers that damages may have been caused to the pipe lines, he shall be entitled to order the length to be retested at the expense of the Contractor. Should such retest prove unsatisfactory, the contractor shall at his own expense amend the work and carry out such further tests as are required by the Engineer.

(e) It shall also be ascertained by the Contractors that each stretch from Robohole to Robohole is absolute clear and without any obstruction by means of visual examination of the interior of the pipe line suitably enlightened by projected sunlight or otherwise.

5.10 Fracture of pipes

a) In the event of pipes being fractured after being to all appearances properly laid whether due to imperfect loads have been formed or the material for refilling have been improperly selected or to any other cause, the Contractor in every instance will be held responsible and will be called upon to replace such defective pipes at his own cost, if such defect appears before the expiration of the period of maintenance.

(b) Any pipe or length of pipes found to be defective shall be immediately removed and replaced at the Contractor's expense and leaking joints shall be remade, the inspections and tests shall then be repeated as often as necessary until the whole line under inspection or test is accepted by the Engineer.

5.11 All works to be clear, clean and perfect

The contractors shall after completion or whenever required by the Engineer, prove all pipes and fitting to be clear clean and perfect, and for this purpose shall, at their own expense and in the presence of the Engineer or his appointee, provide suitable instruments and appliances and pass them through the pipes and shall if required, throw in water and show that it passes freely through

every portion of the work. Brick, mortar and rubbish shall not be allowed to fall into the Roboholes of sewer lines while fixing or if allowed, shall be removed by the Contractors at their own expense.

"During the cleaning operations of newly constructed sewer and Roboholes, contractors shall take for the safety of labourers, all precautions, as detailed in General Specifications Part II."

5.12 Tests on Jacking Pipes (minimum NP – 4 Class)

Factory Tests

One pipe out of every 75 pipes or part thereof manufactured for each diameter shall be tested for Three Edge Bearing Test in a laboratory at pipe manufacturing unit or at any institution approved by the Engineer at the Contractor's expense.

Every pipe shall be subjected to following dimensional conformity tests and the tolerance shall be within limits as indicated below-

Length

Pipe Dia in mm	Tolerance for all types of pipes in mm
1000 and above	+25

Perpendicularity of faces

Pipe Dia in mm	Tolerances in mm	
	RC Jacking pipe	Steel Jacking Pipe
Above 1000	8	1.6

Deviation from straight

Pipe Dia in mm	Tolerance for all type of pipes in mm
Above 1000	±10

Deviation from pipe dia

Pipe Dia in mm	Tolerance for all type of pipes in mm
Above 1000	+0, -16

PART 6:

EXECUTION

6.1 Information for the execution of works

Where specified in the Drawings and Bills of Quantities, sections of the pipeline shall be laid by microtunneling and pipe jacking or other method approved by the Engineer. The word tunnelling in this Contract implies microtunneling and pipe jacking

The Contractor shall be responsible for inspecting the sites and familiarising himself with the conditions under which the work will be performed and with all necessary details including geotechnical investigations and buried services location as to the orderly and successful execution of the work. The omission of any details shall not relieve the Contractor of full responsibility for the satisfactory installation of the work in its entirety. No monetary or other claims made by the Contractor on the grounds of want of knowledge will be entertained by the Corporation.

Plans and details of the equipment, materials and the method of construction to perform and complete the work shall be submitted by the Contractor and must be approved by the Corporation during the e-tendering stage and also by the Engineer during the construction stage before commencing these operations. Approval by the Engineer shall not relieve the Contractor of his sole responsibility for the efficiency, reliability, and soundness of the method employed in completing the work in a satisfactory manner.

The contractor is advised that it shall be his sole responsibility to ascertain for himself the extent of work that is required to be done in site and to generally obtain his own information on all matters affecting the execution of the whole of the works involved in this contract to the entire satisfaction of the Engineer. No claim of extras in consequence of any alleged ignorance in any aspect will be entertained by the Engineer. It must be clearly and definitely understood that the contractor shall be held solely responsible for making all necessary arrangements and co-ordinating with all relevant Authorities, Specialists, Sub Contractors, etc to ensure satisfactory and timely completion of this contract.

6.2 Execution of works-General

The Contractor shall be fully responsible for the design and construction of the jacking/ launching and receiving pits, thrust wall, installation of jacking equipment, installation of any other equipment, sheeting/ shoring, bracing, etc., and for the efficient execution of the work. Full details of his proposals, including plant, Micro Tunnel Boring Machine (MTM), ancillary

equipment, operating procedures, jacking pit and intermediate jacking stations, rock cutting tools, repair of leakage etc. shall be submitted to the Engineer, and shall be fully satisfactory to him before construction. However, review of the plans shall not relieve the Contractor from his responsibility to provide a safe and satisfactory arrangement.

The Contractor shall be required to monitor closely the progress of the tunnelling/ jacking and drilling operation. Daily manual logs or site records of thrusting pressures, cutter head face pressure, torque, bentonite injection rate and the line and level measurements, pitch, roll, slurry system flow rates & pressures, steering jack readings, rate of boring etc. shall be properly maintained in addition to any computerised data logging and shall be available to the Engineer's representative at all times. Such records shall be duly signed by the Contractor's site in-charge. If the Contractor fails to maintain and produce such details before the Engineer's representative on site, the Engineer's representative may order suitable steps including suspension of the work without prejudice to any other rights of the Engineer. The Contractor shall be solely responsible for such actions ordered by the Engineer's representative.

It is the responsibility of the Contractor to ensure that the completed tunnels are watertight. If leakage occurs before completion or during the maintenance period, the Contractor shall carry out any remedial work that may be necessary to make the Works watertight all at his own expense.

6.3 Location and verification of buried services.

The Contractor will be held solely responsible for making his own investigations of any buried services in the vicinity of the Works and to protect them from getting damaged due to his work. Contractor shall allow in his rate for any extra costs for detecting all obstructions and buried services including appropriate measures to protect the services and temporarily divert the same in consultation with the concerned agency with its prior approval regardless of whether they are indicated on the drawings or not. It shall be the Contractor's responsibility to obtain any permission from such agencies. The Engineer/ Employer may issue necessary recommendation letters if required.

The contractor shall engage at his own cost a competent service detecting technician or agency who shall have state-of-the-art detecting equipment to locate and verify all the buried services such as pipeline, water, telecom, electricity, gas and all other services, and abandoned services and structures well ahead of commencing the works.

The detector shall be able to receive narrow signal responses from buried services in order to pinpoint the position and direction of the services. It shall also be able to pick up the position and

direction of different services in congested area and detect the buried services regardless of almost any environmental interference.

Combination of Ground Probing Radar (GPR) and Electromagnetic Location (EML) testing is considered effective for locating the underground utilities and buried objects. The lines tested using GPR and anomalies located using EML shall be topographically surveyed using a Total Station / Theodolite at the same time as the geophysical testing is carried out.

The information so collected shall be submitted to the Engineer after getting it confirmed from the respective agency in accordance with clause 4.10. It shall be clearly understood by the Contractor that no work shall be carried out without locating all the buried services and he will be held solely responsible for any consequential expenses and delays if he ignores this specific requirement or fails to locate any services along the route.

The Contractor shall take every precaution that in the opinion of the Engineer and as advised by the owner of the utility is necessary for the protection from injury of all existing and proposed water, drain, pipeline and other pipes, electric, optical fibre and telephone conduits, and other existing works, roads and services wherever encountered or which are adjacent to the works, and to maintain the same until in the opinion of the Engineer the general progress of the work renders further protection unnecessary. All damage occasioned by the Contractor to these works and services shall be repaired at once at the Contractor's risk and cost, as directed by and to the satisfaction of the Engineer.

All the buried services shall be investigated / located as per the above requisite conditions and their location shall be plotted on drawings to be submitted to the Engineer. No extra payment will be admissible in this regard.

6.4 Site investigation

The Contractor's site investigation for microtunneling or any other acceptable trenchless technology work shall be critical and the most important engineering work to be carried out before commencement of work on site. The contractor shall clearly understand the importance of establishing the subsurface ground conditions and their range of variability along the pipeline route well before embarking on the actual works. There should not be any room for unforeseen ground conditions and is absolutely necessary for the Contractor to know what is to be encountered during the tunnelling operation. The contractor shall be deemed to have accurately established the types of soil and rock strata along the tunnel bore and their range to enable him to select the equipment / machines and to set-up and operate correctly.

6.5 Subsurface investigation

The subsurface investigation shall include study of all existing geological and geotechnical information for the area including the information pertaining to the project and the location maps of all the services in the area from the utility companies/authorities for initial planning. Data on abandoned and existing obstruction, foundation, piles and the structures in the vicinity of the alignment shall be also collected. Field survey using utility services locator and trial trenches may also be carried out to verify the location of the services and obstructions.

The effect of microtunneling through contaminated geotechnical conditions should be taken in to account, where potentially contaminated soil and / or ground water have been identified during the investigation process. A contingency plan identifying methods for handling contaminated soils shall be submitted for Engineer's approval.

Mapping out of the subsurface soils/rock profile along the pipeline alignment and locating underground utilities and buried objects by geophysical testing such as the combination of Ground Probing Radar (GPR) and Electromagnetic Location (EML) testing is considered useful in determining the nature of ground to be encountered. Investigations may include documentary survey; bore logs, geophysical investigations, in situ & laboratory soil / rock tests. Various geophysical investigations include but not limited to Ground Probe Radar (reflection of electromagnetic waves), Radio Magnetotellurgy (measurement of resistivity in electromagnetic field of a radio transmitter), Electrical Method (measurement of apparent resistivity by injection of direct current and measurement of potential difference), Seismic Refraction (refraction of seismic waves on layers at speed increasing with depth), Seismic Reflection (reflection of seismic waves on contrasting interfaces), Microgravimetry (local variation in gravitational field to detect cavities).

The Contractor is deemed to have allowed for any extra costs in his rates and to be aware of similar state of the art ground probing/mapping technology currently available on the market and to have made provision for its use in the project as part of his subsurface investigation works.

The contractor shall be deemed to have in possession of all the information and data required to accurately evaluate the subsurface conditions before commencement of any works.

6.6 Geological and geotechnical evaluation.

The contractor shall allowed for any extra costs in his rates to carry out full geotechnical investigation along the proposed alignment of sewer line, as necessary for microtunnelling operations including delivery of core samples to the Engineer in properly indexed core boxes and

submission of report (5 copies) to the Engineer. No extra payment shall be admissible in this regard. He shall also obtained, studied and evaluated all the geological and geotechnical data for the sites including any data if available with the corporation for the sites and made his own judgement and conclusion on the types of soils and rock to be excavated along the pipeline route. The Contractor must supplement this information possessed by him with appropriate geotechnical investigation prior to selection of appropriate tunnelling/ drilling machinery.

The applicant shall inform himself thoroughly and make his own deductions as to the nature of the materials to be excavated, the difficulties of making and maintaining the required excavations and of doing other work affected by the geology of the Site and shall accept full responsibility thereof.

6.7 Bore logs and ground probing

Sufficient numbers of boreholes shall be taken by the Contractor, if deemed necessary, in areas where the soil strata are complex. The contractors shall also carry out simple probing techniques at closer interval to reaffirm the types of soils to be encountered along the pipeline route. The Contractor should submit Geotechnical profile along the route of the pipeline and buried services data for particular work package as per the schedule for submittals.

The Contractor shall collect soil/ rock samples at the level of the proposed pipeline in presence of the Engineer's represent and get the same tested for sieve analysis, cohesion, angle of internal friction, ground water level, Unconfined Compressive Strength (UCS), abrasivity etc. in the Municipal laboratory or at any laboratory approved by the Engineer. Samples taken in absence of the Engineer's representative and tested in a laboratory not approved by the Engineer shall not be valid for determination of the any parameters.

6.8 Groundwater investigation.

Ground water condition is one of the critical data required when selecting the microtunneling system. Ground water affects the safety of the excavation face, start and exits of the tunnelling/ drilling equipment from the shafts .Uncontrolled extraction of water from the surrounding during excavation can affect the adjacent structures. Piezometric pressure, water leakage, ground water level and etc shall be carefully checked before and during tunnelling/ drilling works.

6.9 Ground stabilisation

It shall be the responsibility of the Contractor to maintain stable soil conditions at the jacking face to prevent loss of ground above the jacking operation and movement of the surrounding earth. The methods of maintaining face stability and preventing ground movement and subsidence shall

be by means of fluid slurry or earth pressure applied to the tunnel face. Alternatively, unstable ground ahead of the jacking face may be stabilised by the injection of suitable chemicals. Methods which require dewatering of the ground will not be accepted, nor will methods which may lead to significant ground loss.

Movement or settlement of structures, railways, utilities and pavement shall be monitored by the Contractor during the microtunneling operation and reported to the Engineers and railway or highway authorities.. The Contractor shall make provision to install peizometers, settlement plate etc within railway compounds in his rates for pipe installation If movement or settlement occurs, especially within the railway compounds, which in the opinion of the Engineers may cause damage, the Contractor shall take immediate action to prevent further movement, settlement or damage. The Contractor shall repair at his risk and cost any damage and restore structures, railway lines and pavements to the satisfaction of the Engineer. The contractor shall pay expenses if the owner or concerned agency such as Railway elects to carry out such repairs by themselves.

6.10 Setting out

The Contractor shall be deemed to have thoroughly examined the sites, the location of the buried services, geological profile, availability of space for footprint, traffic management thereat, access to sites &etc and adjusted the pipeline alignment as deemed necessary and obtained approval of the final pipeline alignment from the Engineer before commencement of the setting out. He shall set out and mark on the ground the proposed pipeline route and the locations of the jacking and receiving shaft and the area they occupy for the Engineer's inspection and approval. The Contractor shall be solely responsible for the accuracy of the setting out and any expenses or delays arising from errors made in the setting out shall be borne by the Contractor. Any consequential work or abortive work carried out by the Contractor to rectify the errors shall be entirely borne by the Contractor.

6.11 Site layout

The working space at the sites is often restricted and hence the site layout has to be planned carefully in advance to set-up the equipment and accessories.

6.12 Construction of Jacking and Receiving Shaft

The excavations for Jacking or Receiving shafts may be used for construction of Roboholes or valve chambers if required. The Contractor shall submit to the Engineer for approval dimensioned drawings and calculations of the timbering or trench sheeting details for the shafts. Each shaft shall have a separate ladder bay for access which shall be isolated from the part of the

shaft used for hoisting materials. The shaft trenching shall be watertight and shall prevent any pressurised slurry from the tunnel face reaching the shaft.

Soil improvement methods that can be used include grouting, ground freezing, and dewatering. If the ground consists of unstable soil, the same may be stabilized by vibro / dynamic compaction, by compressed air for sandy soils and by ground freezing, preloading, lime treatment for clayey soils. In certain instances, ground treatment or groundwater management methods may be required to enable the construction of the shaft to proceed. These include well pointing and deep wells, Compressed air, Suspension grouts, Chemical stabilization, Ground freezing. There are various shaft construction method alternatives, Liner plates, 2-flange steel liner, horizontal metal sheeting, sloping or battered excavation, trench boxes, slide railing system, soldier piles with timber lagging, soldier piles with steel lagging, steel / concrete / RCC sheet piles, CMP shafts, concrete sinking shafts, precast concrete segments, concrete slurry walls, Pre-cast or cast in- situ caissons, Rock anchorage rods and tensioned rock bolts, metal straps, un-tensioned steel dowels, Wire mesh with guniting and ground freezing. No extra payment shall be claimed by the contractors for carrying out soil improvement / stabilization, or shaft shoring techniques as mentioned above other than BOQ items.

The Contractor shall submit the design and construction details of all Temporary Shafts and their proposed locations along the tunnel alignment to the Engineer for acceptance. The submission shall also include details on shoring system, entry and exit arrangement, thrust wall layout and design details, general layout of guide rail and jacking table arrangement etc. Temporary Shaft drawings are to include but not limited to:

1. Launch/jacking and reception shaft configurations.
2. Design and construction of launch/jacking and reception shaft.
3. Details for excavation and backfilling procedures, ground support systems, and ground stabilisation if required.
4. Special requirements for jacking and receiving shaft penetrations, thrust blocks, backstops or other reactions required for Microtunnelling, casing pipe jacking or any other jacking.
5. Full calculations supporting maximum jacking capacity that jacking shafts will withstand
6. Dewatering and ground water control plans for all temporary and permanent shafts.

The shaft shall be kept dry at all times and shall have a drainage sump to pump out the ingress water. The Contractor is deemed to be fully aware of the serious consequences to the tunnelling equipment and other accessories if the shaft is flooded. He shall take every precaution to avoid flooding in the shaft. The shaft shall be well protected against surface runoff getting into the shaft. The contractor shall be solely responsible for any consequential delays and expenditure arising as a result flooding the shaft.

The shaft floor shall be designed to withstand the tunnel machine and other accessories and shall be designed to withstand uplift forces.

The Contractor shall be solely responsible for providing and subsequent removal of shoring to the shafts or pits and ensuring stability of the sides of such excavations and safety of adjoining structures.

The sizes of the shafts shall be kept as small as possible considering site constraints. Equipment manufacturer's data on required shaft sizes shall be furnished to the Engineer along with the bid. The sizes of pits shall take due cognizance of available space needed for jacking frame, shoring or feed pumps or other ancillary equipment, thrust wall and entrance ring.

6.13 Construction of Thrust Wall

Thrust wall shall be designed and constructed by the contractor to the approved details. The thrust wall shall be of MS plate, reinforced or unreinforced concrete constructed against the wall of the jacking shaft. The Contractor shall ensure that the thrust wall is constructed as an independent structure and it shall not interfere with the jacking shaft or the floor when jacking force is applied on to it. Contractor shall indicate in his submittals the construction details of the thrust wall showing details on how the wall be made independent of the jacking shaft structure.

The contractor shall ensure that the thrust wall and the soil behind are in complete contact and there is no gap between them. The contractor shall further ensure that the thrust wall shall effectively transfer the jacking force on to the soil behind and that the ground behind is capable of withstanding the jacking force.

In the event that there is gap between the thrust wall and the soil behind, the Contractor shall arrange the gap to be filled with approved cement grout before loading the thrust wall.

6.14 Installation of Guide Rails

The contractor shall design and fabricate the guide rail / Jacking frame in accordance with the microtunneling equipment manufacturer's details and install it firmly onto the floor of the jacking

shaft. He shall ensure that the guide rail / Jacking frame is installed to the correct grade, levels and alignment. It shall be also square to the pipeline alignment at all times and not disturbed due to forces arising from the jacking operation. He shall arrange with the Engineer's representative to check the level, alignment etc of the guide rail and obtain the Engineer's endorsement before commencing guide the pipe jacking work.

6.15 Entrance and Exit Arrangement

One of the most critical microtunneling operations is the launching and retrieval (entry and exit) of the microtunneling machine. Often this process takes place well below the water table. In those cases, it is critical that the contractor implement adequate engineering measures including stabilisation of unstable soil by grouting or other means to prevent soil and water inflows into the shaft.

It is common practice to install a rubber seal at the entry and exit. The seal is to prevent the flow of ground water or lubricant (used for reducing the frictional resistance) through the shield/pipe entry opening on the shaft wall.

An exit ring must be provided without exception if the strata at the level of exit happens to be loose.

The contractor shall plan this work well in advance and fabricate the fittings and rubber seal as per approved method.

6.16 Soil Stabilisation at the Tunnel Entry and Exit.

In addition to the seal, it may be necessary to stabilise the soil behind the entrance wall. This is to prevent any free flow of unstable soils into the pit when opening is made for the shield to enter into the ground. Chemical grouting, cement grouting, jet grouting, piles, ground freezing or temporary shoring are some methods commonly used by the contractors to prevent the soil flow into the shaft.

6.17 Cement Grouting

The Contractor shall be fully responsible for preventing the occurrence of voids outside the pipe and if they occur he shall fill them with cement grout. Immediately following the jacking operation the Contractor shall pressure grout the jacked section to fill all voids existing outside of the pipe. Grouting shall be from the interior of the pipe through grouting holes as specified. The grout mix shall be at least of CM 1:3.

Systems of standard pipe, fittings, hose, and special grouting outlets embedded in the pipe walls shall be provided by the Contractor. Care shall be taken to ensure that all parts of the system are maintained free from dirt. Grout composed of cement, sand and other approved compound and water shall be forced under pressure into the grouting connections at the invert and shall proceed until grout begins to flow from upper connections. Connections shall then be made to these holes and the operation continued to completion.

Apparatus for mixing and placing grout shall be of a type approved by the Engineer and shall be capable of mixing effectively and stirring the grout and then forcing it into the grout connections in a continuous uninterrupted flow.

After grouting is completed, pressure shall be maintained by means of stop cocks, or other suitable devices until the grout has set sufficiently. After the grout is set, grout holes shall be completely filled with dense concrete and finished neatly without evidence of voids or projections.

6.18 Jacking System

The hydraulic jacking system shall be installed against a purpose built thrust wall in the jacking shaft. The substantial force required for jacking pipes and the tunnelling machine shall be provided by high pressure jacks driven by hydraulic power packs. The ram diameter and stroke of the jacks may vary according to individual contractor's technique and to suite site conditions.

The jacks shall be mounted on specially made frames so that the jacks are square to the pipe alignment. The jacking frame shall be firmly supported to the floor so that it does not move during jacking.

There are jacking systems with multiple strokes or long stroke (3m or 2.43m long), mounted on a specially made jacking frame available to push a full length pipe in a single setting. The system does not require the use of spacers and hence a substantial increase in productivity can be achieved by using multiple stroke jacking system.

6.19 Jacking force.

The Contractor shall calculate the expected jacking load for each microtunnel drive well ahead of designing the jacking pipes. Accurate estimation of the jacking load is necessary to determine the pipe wall thickness, the need for intermediate jacking stations and lubrication requirements, types of jacking system and thrust block design. The overall jacking force depends on the type of surrounding soil, depth of cover, pipe materials, diameter and the overall length of the pipeline. The total jacking force essentially consists of two components, "Frictional force around the

pipeline” and the balancing force at the tunnel face called “Face Pressure”. The Contractor shall use appropriate geo-mechanics formulae and guidelines for computing the jacking force. The contractor shall calculate the anticipated jacking force for each drive and submit his calculation to the Engineer for approval.

The Contractor shall be solely responsible to ensure that the pipes are not subjected to excessive jacking force or torsional force so as to crush them. If such thing occurs the contractor shall have to remedy the situation at his risk and cost.

6.20 Pipe Lubrication System

The boring machines are commonly designed to overcut about 10mm (in some cases up to 20mm) around the external diameter of the pipeline. The pipeline can, in theory, be jacked freely through a fluid medium by injecting a clay based (bentonite) or polymer based lubricant into this annulus. In practice, however, fluid losses may occur into the surrounding ground. The contractor shall carefully monitor the jacking force and use appropriate lubrication system, to bring down the jacking force within the allowable jacking force for the pipe.

6.21 Programme and Progress Chart

Within one week of the Date of Acceptance of the Bid, the Contractor shall submit a Construction Programme showing the time within which the various significant activities of the work will be executed and completed. External dependencies such as provision of access, drawing approvals and material and equipment supplied by others shall be identified in the programme. The programme shall make due allowance for public holidays etc.

The Construction Programmes shall be in the form of a critical path network set out to a time scale of working days and critical path of the Works as well as the interdependencies of the activities and available float shall be clearly indicated

The Construction Programme submitted to the Engineer shall be a construction programme under clause of the “General Conditions of Contract for civil works” of the corporation. The Contractor shall also supply a soft copy of the work plan in MS Project format to the Engineer.

A section of the overall work plan shall also be displayed at the site offices for each individual site packages and shall be updated every day at the beginning of the office hours.

Any departure from the works procedure as programmed shall first be discussed with and agreed to by the Engineer before implementation.

When required by the Engineer, and/or deemed necessary by the Contractor, an updated Construction Programme shall be prepared by the Contractor to incorporate any changes in the methods, times or sequence of activities, and to show the Contractor's planned progress towards the Date of practical Completion. The level of detail required for the updated programme shall be as specified for the original Construction Programme.

Should the Contractor fail to comply with the provisions of this clause, notwithstanding the provisions of the conditions of the contract, the Engineer may withhold the issue of payment certificate next due and any subsequent payment certificates, until such time as the Contractor complies with the provisions of this clause.

6.22 Special Traffic Precautions

The Contractor's attention is specially drawn to the requirements by the traffic police and road authorities and Specifications regarding Traffic Control, Access and the Reinstatement of road surfaces etc. It shall be the responsibility of the contractor to obtain permissions from traffic police and other authorities well in advance of the commencement of the works.

The Contractor shall obtain separate permission for each Works Package from the respective Senior Inspector of Police (traffic).

The Contractor's progress/programme and road opening schedule must be arranged in details for discussion with the Engineer and the Traffic Police. The laying of pipelines must be broken into appropriate sections and where necessary special traffic diversions arranged.

Whenever carriageways are affected, the Contractor must arrange to contain the works within the narrowest possible area. Excavated material must be removed as the work proceeds or contained within the areas designated by the Engineer/ Traffic Police.

The Contractor shall carry out the work in such a manner as to cause minimum interference with the public use of highways, footpath and other thorough fares.

All workmen working on roads are required to wear approved retro-reflective vests at all times.

The Contractor shall include in his rates for compliance with all the conditions stipulated above.

6.23 Road Opening

Where Roboholes have to be constructed on existing metalled road, the Contractor is required to submit a detailed road opening schedule to the Engineer for approval. In case of works requiring breaking of concrete roads for shafts the Contractors shall provide for reinstatement of concrete

road as per MORTH & Municipal specifications and guidelines in vogue for this purpose and the cost of same shall be deemed to be included in the rate of tunnelling. The contractor shall also provide for additional time for getting the necessary permission from C.C. Roads department in this regards.

The Contractor shall contain the works within the narrowest possible area when laying pipelines along metalled road. The Contractor shall keep the Site and all working areas in a tidy and workmanlike condition and free from debris, muck, rubbish and waste materials. Any Temporary Works, construction equipment, materials or other things which are not at that time required for use by the Contractor may, with the consent of the Engineer, be removed from the Site at Contractor's risk and cost or kept in the available stacking area in orderly manner. Stacking of pipes or liners outside the defined site areas for shafts shall not be permitted. The Contractor shall plan the logistics of pipes and liners with due consideration for the availability of stacking space.

Traffic flow must be maintained at all times along the roads affected by the work. Sufficient lighting, road signs, barricades and traffic diversion signs must be established along the sites of the works in accordance with the Traffic Police requirements and to the entire satisfaction of the Engineer.

The Contractor shall also comply with the conditions imposed by Traffic Police and Roads Opening Conditions and Requirements stipulated by Roads Department, BMC or any other Authority.

Upon the completion of the pipeline or Roboholes, the Contractor shall backfill and make good all disturbances to the road, side table, road kerb and storm water drains to the satisfaction of the Authorities and the Engineer.

If required the pits shall be covered with decking plates with appropriate support so that all traffic shall be allowed to run over the decking. No extra payment shall be admissible for such arrangements and the contractor's rates shall be deemed to cover such requirement. If directed by the authorities or the Engineer, the Contractor shall construct temporary diversion roads at his own cost to allow the traffic to flow through during the construction.

6.24 Partial Covering up of Road in Busy Areas

Where it is unavoidable to locate Robohole shafts or working shafts for tunnels in busy roads, the top of the openings shall be covered by decking, leaving only the minimum required area open at the top to carry out work within the shaft. Vehicles shall be permitted to travel over such covers

provided. The Contractor shall submit to the Engineer details of the partial covering. He shall allow for compliance of this requirement in his rates.

6.25 Reinstatement of Road and affected Surfaces

The Contractor shall carry out the reinstatement of road foundation and road surface in accordance with the Specifications and requirements of the MORTH / Roads Department, BMC. This shall include machine-paving as and when directed by the Engineer. Where road markings are affected, the Contractor shall reinstate with thermoplastic paintings to the satisfaction of Roads Department, BMC. The Contractor shall include in his rates for compliance with all the conditions stipulated above.

The Contractor will be required to maintain in a clean, safe and tidy state the temporary reinstatement of trench and other damage surfaces in roads as specified previously until such time as the permanent reinstatement is carried out.

Permanent reinstatement must only be carried out on receipt of an instruction from the Engineer and the reinstatement will then be commenced within 3 days and completed as soon as possible. The Engineer may instruct the Contractor to reinstate the road intersections as the work proceeds.

The reinstatement must comply with all the requirements of the MORTH, PWD or BMC. Any work not conforming in standard or meet the requirements of the Engineer or the concerned authorities must be immediately removed and replaced.

Should the Contractor fail to carry out all the required reinstatement works within 7 days of his being instructed to do so, the Engineer may arrange for the execution of the work at the expense of the Contractor.

On completion of the reinstatement the Contractor will be required to maintain all the road surfaces etc., affected for the full period of the Contract and Maintenance Period. All faults, settlement etc., developing within this period must be made good immediately upon receipt of an instruction from the Engineer.

The Contractor attention is also drawn to the fact that he will be liable for all claims for injury or damage arising from any defect in the reinstated road surface during the Contract and Maintenance Periods.

The Contractor shall allow for carrying out this reinstatement work in one or more stages; the maintenance of the reinstatement to the satisfaction of the Engineer; the provision of temporary

surfacing, maintenance and subsequent breaking out and removal in the event of this being required for the reinstatement of carriageways; reinstating whatever widths shall have been taken out and any additional width the Engineer considers require reinstating due to the Contractor's operations or to subsidence or traffic; any expense incurred in carrying out the work in short lengths or in stages.

The Contractor shall also allow for the complete reinstatement of all surfaces damaged in side-tables, and all Private or Government's or Corporation's Lands to approval of the Engineer and generally to a condition at least equal to the original ground surface before the Works commenced.

In the event of the Contractor failing to carry out maintenance work and this work being done by others, on the others of the Engineer as set out in the Specification, then the cost so incurred shall be borne by the Contractor and deducted from money due or to become due to the Contractor.

The Contractor shall also allow for matching paving in all reinstatement of road surfaces.

6.26 Ventilation

The Contractor shall provide adequate ventilation and efficient apparatus to keep all excavations, tunnels and pipelines free from all dangerous gases, whether generated in the soil strata or otherwise, and he shall take precaution to ascertain that they are in a safe condition before allowing his workmen to descend.

While working in existing pipeline or Robohole, the Contractor shall provide air blowers to ventilate the place as sewage gas usually contains a high proportion of hydrogen sulphide, methane and other toxic gasses which in combination with oxygen is explosive. Approved gas monitors/detectors and oxygen meters shall be used to ensure that the place is free from all dangerous gases. The Contractor is required to appoint a Supervisor/ Safety Officer to ascertain that the pipeline or Robohole is in a safe condition before allowing his workmen to descend and work. No smoking or naked flame shall be allowed in the pipeline or Robohole. Monitoring of the air quality shall also be carried out regularly by the Contractor's supervisor while work is in progress and work shall be immediately suspended should unsafe conditions develop.

The Contractor is warned that besides performing any work in existing pipeline or Robohole, connecting to or breaking into existing pipeline or Robohole also poses potentially hazardous conditions. The existing pipeline or Robohole to which connection is to be made should therefore be thoroughly ventilated and certified as safe by the Supervisor/ Safety officer before workmen are allowed to execute the connection.

The Contractor and his Supervisor/ Safety officer shall be solely responsible for safety of persons entering in to the pipelines or confined spaces like Roboholes/ pits.

6.27 Continuous working

If, in the opinion of the Engineer it is necessary, by reason of the safety of the works, or the restoration of interrupted services or for any other reason whatever, the Contractor shall, when so ordered carry out the works or any portion thereof continuously by day and by night without extra charge and allow for such a contingency in his Bid price.

It shall be clearly and definitely understood by the Contractor that no claims in respect of any of the above shall be allowed in the settlement of the Final Account.

6.28 Trial holes

The Engineer may order the Contractor to make trial excavations/ trial bores and to submit a report and/or drawing of the data obtained from each such excavation.

6.29 RCC / Steel sheet trenching works

Wherever the sub-soil conditions are expected to be of a soft and unstable character, the normal methods of timbering may prove insufficient to prevent subsidence of the adjoining road surfaces, drains and canal and other services or adjoining buildings and structures, in such circumstances the Contractor will be required to use RCC / steel trench sheeting or RCC / steel sheet piling adequately supported by timber or steel struts, walling, etc.

Steel sheet piles shall conform to the provision of I. S 2314 or B.S. 4360 and shall be driven where required as directed by the Engineer.

The Contractor will be required to design the layout of the piling and the overall dimensions of the excavation to suit the sheets and corners available and to give sufficient working space for the proper construction of the work.

The Contractor will be expected to supply, pitch, drive and subsequently remove trench sheeting or piling in accordance with other items of the Specification and the terms “timber” or “timbering” shall also apply to RCC / steel trench sheeting or RCC / steel sheet piling throughout. The Contractors shall be solely responsible for design of any shoring or timbering or sheeting system and their adequacy and safety. The rates quoted by the Contractors shall be inclusive of such measures of providing steel sheeting or sheet piling.

6.30 Sewage in the connecting sewers

The pipelines installed under this Contract are meant to connect some of the existing functioning upstream and downstream functioning sewers. It is considered that these pipelines are carrying sewage and may also be in surcharged conditions at times.

6.31 Connection to existing sewers

The Contractor shall note that in connecting pipelines to existing sewers, every care shall be taken to ensure that the connections are watertight and the existing pipelines are not damaged. Special precautionary measures shall be taken to ensure the stability of the pipelines connected to them.

The Contractor shall ensure that there is no interruption to existing flows during the dry connection works. No debris shall be allowed to fall or be discharged into the existing pipelines or Roboholes. Any debris which falls into the existing pipeline/ Roboholes and any obstructions thereby caused shall be removed at the Contractor's expense immediately.

All connection to existing pipelines shall be subject to water tightness test and must meet the requirement for the same.

It shall be noted that during connecting the newly laid sewer line to the existing sewer, or for connecting cross sewers to the newly laid sewer, or to repair existing sewer, the contractors shall make necessary arrangement at his own cost, to procure Pneumatic plug / Inflatable plug / mechanical plug / Pillow plug for plugging existing sewer line. Plugging existing sewer by using mud / sand filled gunny bags will not be permitted. Plugging shall be done in co-ordination with & as directed by concerned staff of Main Sewer Dept.

Safety measures for use of Sewer Plugs -

Contractors need to ensure that the sewer plug is inspected prior to each use. The plug shall be partially inflated and inspected under low pressure for any obvious wear, tear, cuts, abrasions or damage. Also, examine the accessories with which the PLUG is to be inflated.

Inflation pressures as in the Manufacturer's instruction manual and on the plug, must be adhered to when inflating the plug, but never exceed the max. working pressure. Check the internal pressure in the PLUG regularly.

Utilizing an air line extension plugs can be inflated from a distance, away from the danger zone or outside.

The PLUGS shall only be used by persons who have been properly instructed and who are trained for the use.

When using the PLUGS, the safety of the user and any bystanders must always be borne in mind, as wrong use can cause life threatening situations.

Contractors shall consider measures to brace for and absorb the impact of plug failures and to prevent the PLUG from sliding out. This may include anchored ropes/cables in upstream Roboholes, bracing in the chase of the plugged Robohole, or a combination of methods, all with associated risk assessments and controls in place.

Ensure only the use of approved and calibrated pressure gauges. And also ensure pressures are monitored and controlled during plug inflation / deflation with calibrated gauges.

The Contractor shall allow for all the above in his rates and no extra payment on this part is permissible.

6.32 Supply and delivery of pipes

The Contractor is required to schedule his own requisition for pipes and he shall ensure consistency in the delivery of the pipes as demanded by the work schedule.

Any delay in the delivery of pipes which affect the progress of the work shall be solely the responsibility of the Contractor.

6.33 Laying pipelines in well established residential areas

The Contractor shall note that certain section of the pipeline will be laid in close proximity to existing premises. He shall take all necessary precautions, including the provision of RCC / steel sheet piling cut-off walls where necessary, to prevent any damage to the existing premises and shall be responsible for the damage and complete repairs of the same.

The Contractor shall be responsible for obtaining permissions from the owners of private premises if needed by him for his work. He shall be responsible for restricting his workmen to the site of the work while working in private premises. If the Contractor considers it essential to have additional working space he may obtain the same from private property owners entirely at his risk and cost. The Engineer is not bound to arrange for such facilities from private property owners.

Temporary fencing shall be erected as directed by the engineer to separate the worksite from the rest of the private premises at the Contractor's own expense for all execution.

Turf, walls, slopes, fencing, shed or any other structures whether directly or otherwise disturbed or damaged by the construction work shall be reinstated to the original conditions by the Contractor at his own expense.

The Contractor shall allow in his rates for complying with these requirements as no claim to the contrary will be entertained by the Employer/ Engineer.

6.34 Co-operation with other contractors

Where there are other contractors employed by the Employer or any other agency working in the same area, the Contractor must programme/plan his works to be contained within his working space to avoid any interference to and by the other contractors, and shall schedule the work in co-ordination with them. No claim on account of this clause will be entertained by the Corporation and his prices are to include for such contingency.

6.35 Interaction/liaison with utility personnel

The contractor shall note that it is the responsibility of the Contractor to co-ordinate and arrange meetings with Utility Companies or the Government or Municipal Departments and obtain necessary permissions or get the utilities diverted. The Corporation would arrange to give authority letters to the Contractor for arranging such meetings. The Engineer's representative may be present in such meetings. The Corporation is not contractually bound to accept what transpired in any meetings or discussions in which the Engineer or the Corporation was not represented.

6.36 Hydraulic testing of Sewer line & Handing over of completed works.

Upon completion of works the sewer lines including rising mains shall be hydraulically tested as per the required pressure. After successful testing, the contractors must clean the site as per the satisfaction of the Engineer and the same shall be handed over by the contractor to the user department (Sewerage Operations department) under proper acknowledgement and certificate to this effect.

Hydraulic testing and cleaning up the site on completion is to be done by the contractors at his own cost and no extra payment shall be admissible for this requirement.

6.37 Remedial Measures to be adopted by the Contractor

The Contractor shall take each and every precaution to ensure that the tunnelling or drilling equipment will successfully excavate along the chosen pipeline alignment before he commences the operation. In the event of inability to complete the drive, due to break down or any other reasons, the Contractor shall be fully responsible to recover the equipment safely from the ground and restore the incomplete work to the original condition at his risk and cost by a method agreed with the Engineer and the concerned authorities within the time stipulated by the Engineer or the concerned authority.

The Contractor shall in his Submission clearly state the measures that he would implement to retrieve the shield without causing interruptions to traffic and public life and without causing any damage to the property belonging to the BMC/ MMRDA or any other third party etc.

The cost for such retrieval measures or any consequential expenditure or delays arising from thereof shall be entirely borne by the Contractor. Any failure of remedial measures shall be entirely at the risk and cost of the Contractor. Any abandoned hole or tunnel must be backfilled to the top of the hard strata with concrete or gravel with grouting to provide a solid infill, or other method agreed with the Engineer completely at the Contractor's cost so as to prevent subsequent settlement.

SECTION: B, TECHNICAL SPECIFICATIONS FOR PIPELINE WORKS: MATERIALS AND WORKMANSHIP

PART 1. SPECIFIC REQUIREMENTS

B.1.1 Transport of materials

It shall be noted by the Contractor that transport of the materials of construction overland will be subject to co-ordination/ regulation of transport during peak hour traffic in the city/suburbs. The Contractor's rates/prices shall include for all costs arising from the imposition of traffic hours restriction by the Traffic Police.

B.1.2.1 Electrical Power

The Contractor shall at his own cost, arrange for electrical power required by him for the execution and completion of the Works.

B.1.2.2 Water for Construction/ Workmen

The Employer will make available water connection for execution and completion of the Works at one point near the site of the Works as per availability. Water shall be made available to the Contractor from nearest municipal outlet. The Contractor shall make appropriate application for getting the water connection from the Hydraulic Engineer's department and shall pay necessary charges and deposits in this connection.

The Engineer may however, allow use of water from other sources viz. lakes, wells etc. for construction purposes to supplement the water supply from the mains. The Contractor shall bear all costs for pumping and conveyance of water from such sources.

B.1.3 Contract Drawings

List of Bid drawings are given along with this Bid document. These drawings are meant for Bidder's guidance only. "Released for construction" drawings will be furnished to the Contractor during the progress of the work as when required. "Released for Construction" drawings may be revised and revised copies issued to the Contractor from time to time by the Engineer.

The Contractor shall carefully scrutinize the drawings and shall draw to the attention of the Engineer before execution of the work any discrepancies or ambiguities between one drawing and another in sufficient time to allow the Engineer to make necessary adjustments.

B.1.4 Issue and Return of Contract Documents.

The two certified true copies of the Contract Document (including drawings) will be returned to the Contractor. Two copies of all further "Released for Construction" drawings may be supplied as necessary.

One set of the Contract documents shall be kept with the Engineer's representative at all times. One set of concerned drawings shall also be kept at each site office for different packages.

B.1.5 Procurement of Pipes.

The Contractors shall also arrange to procure R.C. pipes and specials (or any other pipes as necessary) as needed.

It shall be the responsibility of the Contractor to ensure adequate inventory of the pipes of any type.

B.1.6 Temporary works

Within a reasonable time (7 days) before he intends to commence construction of any temporary works, the Contractor shall submit the method statement, designs and drawings for the consent of the Engineer. Submission to and acceptance by the Engineer shall not relieve the Contractor of any of his duties and responsibilities under the Contract. The contractor shall along with his Bid submit preliminary designs, drawings and method statement.

No change in method from that mentioned in his bid shall be permitted unless absolutely necessary due to site conditions and no extra claim shall be entertained for such alternative method.

B.1.7 Assistance for the Engineer's Staff

The Contractor shall provide all necessary assistance to the Engineer's Representative and his staff in carrying out their duties of checking the setting-out, inspecting and measuring the works.

The Contractor shall provide chainmen, staff men, office attendants and labourers as may be needed from time to time by the Engineer's Representative. One labourer shall be deployed at all times at the Engineer's site office to assist the Engineer.

The Contractor shall provide for the Engineer's Representative and his staff such protective clothing, Safety goggles, safety helmets, hand gloves and rubber boots of suitable sizes, hand lamps and the like as may be reasonably required by them. These articles shall remain the property of the Contractor.

B.1.8 Access and Site Roads

The contractor shall construct, maintain and afterwards remove and reinstate site roads and accesses required for the execution of the works. The cost of such works shall be borne by the Contractor.

B.1.9 Use of I.S. Specifications

In case no particular specification is given for any work to be done under the contract, the relevant specifications, where exists, of the Bureau of Indian Standard shall apply. If in case relevant IS specification is not available, the Contractor shall obtain specific permission from the Engineer for use of any other Standard or Code of Practice followed in other country. He shall supply authenticated copy of such standard or code to the Engineer along with his request for the permission.

B.1.10 Works to be kept clear of water

The Contractor shall keep the Works, including the Works in the coastal areas and all underground works, well drained until the Engineer certifies that the whole of the Works is substantially complete and shall ensure that so far as practicable all work is carried out in the dry. Excavated areas shall be kept drained and free from standing water except where this is impracticable having regard to methods of Temporary Works properly adopted by the Contractor.

The Contractor shall construct, operate and maintain all temporary dams/ cofferdams, watercourses and other works of all kinds including extensive pumping and well-point dewatering plant that maybe necessary to exclude water from the Works while construction (including plant installation work by other contractors) is in progress. Such temporary works and plant shall not be removed without the approval of the Engineer's Representative.

Notwithstanding any approval by the Engineer's Representative of the Contractor's arrangements for the exclusion of water the Contractor shall be responsible for the sufficiency thereof and for keeping the Works safe at all times particularly during any floods and for making good at his own

expense any damage to the Works including any that may be attributable to floods or tides. Any loss of production or additional costs of any kind that may result from floods, tidal inundation or waves shall be at the Contractor's own risk. Floods, tidal inundation or waves shall not be an "Employer's risk".

All costs for works to be kept clear of water shall be deemed to be included in the rates/prices quoted for such items of work requiring dewatering. No extra payment for this arrangement will be made.

B.1.11 Claims for damage to persons or property (procedure)

The Contractor shall be responsible for any claim for damage to person and/ or property and the Contractor is deemed to have indemnified the Engineer/ Employer against such claims. Any claim received by the Employer will be passed to the Contractor who shall likewise inform the Employer of any such claim which is submitted directly to him by a claimant. The Contractor shall do everything necessary, including notifying the insurers of claims received, to ensure that all claims are settled properly and expeditiously and shall keep the Employer informed as to the progress made towards settlement, failing which the Employer shall be entitled to make direct payment to claimants of all outstanding amounts due to them in the Employer's opinion and without prejudice to any other method of recovery to deduct by way of set-off the amounts so paid from sums due or which become due from the Employer to the Contractor.

B.1.12 Existing Services

The Contractor shall carry out complete survey of buried services in vicinity of the work sites and which are likely to be affected by the works. The Contractor shall take all due care and necessary precautionary measures to ensure that no damage occurs to any existing sewer pipeline, water or gas mains, electricity, optical fiber or telephone cables, storm water drains, culverts and any other existing services. The Contractor shall be solely responsible for safety of buried services. Any damage arising out of the Contractor's work in such respect will be met with entirely by the Contractor at his risk and cost and no claim to the contrary will be entertained by the Corporation. No extra payment shall be admissible for complete survey of buried services.

B.1.13

Traffic Control

(a) The Contractor will be required to arrange the work sites and order of working in or alongside carriageways to minimise the interference with the free flow of traffic and shall take all measures and precautions required by the Traffic Police, Road Authorities and the Engineer for the safety and convenience of traffic

(b) The work sites must be arranged in length to be consistent with good progress in laying the pipelines and precautions must be taken to ensure the free flow of road traffic.

(c) The Contractor must provide and maintain at each work site proper and efficient automatic traffic lights operating day and night for the full duration of the Works.

(d) The Contractor shall also provide safety barriers, warning signs, signboards, beacons, barricades, lighting, fencing, illuminated traffic diversion signs, flashers etc. well in advance of the work site etc. for ensuring smooth and properly guided traffic flow.

B.1.14 Change in Pipeline Alignment

The Engineer reserves the right to change the centre lines of pipelines, as proposed in the drawings, to any suitable position at his discretion to overcome obstructions and unsuitable ground conditions. No extra claim will be entertained by the Corporation on account of the above contingency except for any additional increase in length of the lines and the Contractor must allow for this contingency in his rates.

Such changes shall be made before commencement of microtunneling work at the site and the contractor shall be notified of such change at least 3 days prior to setting out for the work.

B.1.15 Working space

(a) The contractor shall note that adjoining the existing pipelines other services may have already been laid and his attention is particularly drawn to his responsibility for precise identification and maintenance of the same during the course of construction. The contractor may use additional work area if permitted by the traffic police/railways or PWD or other concerned authorities or private owners of adjoining properties.

(b) The sites for constructing Roboholes/shafts will be made available to the Contractor up to the possible extents only, where possible, of the contract site plan. The Contractor will, however, be required to maintain and protect existing structures, roads, services, trees etc. unless directed to demolish or remove such structures etc.

(c) Any additional working space required by the Contractor will be entirely the Contractor's responsibility and he will be required to obtain all necessary consents, pay all the costs arising out of compensation, etc. and reinstate the land affected to the satisfaction of the owner and the Engineer.

B.1.16 Bench Mark

All levels shall refer to the bench mark with respect to Town Hall Datum.

The Contractor shall establish substantial temporary bench marks and fixed points on the site to the Engineer's direction and shall ensure that these are not damaged or disturbed. All such bench marks and fixed points must be referred to a Master Bench Mark to be given by the Engineer.

B.1.17 Contractor's Plant

(a) All mechanical plants used by the Contractor in the execution of the Works must be of such type, size and of such method of working as the Engineer shall approve. All equipment must conform to the provisions regarding various Environmental Legislations especially in respect of noise and air pollution. The Contractor has to demonstrate the compliance of the equipment with the provisions of Environmental Legislation at his risk and cost.

(b) The Engineer's approval to the use of mechanical plants will not be unreasonably withheld, but if in the Engineer's opinion, circumstances arise which make it desirable that the use of plants should be suspended either temporarily or permanently, the Contractor shall change the method of performing the work affected at his own risk and cost and he will be deemed to have no cause for claim against the Corporation on account of having to carry on the work by another method nor will he be deemed to have cause for claim if any order issued by the Engineer results in the mechanical plant having either to stand idle for a period of any duration whatsoever or to be removed.

(c) This clause shall apply also to plants which, in the opinion of the Engineer, are not as quiet in operation as the circumstances seem to the Engineer to warrant.

(d) The Contractor shall use every possible means to prevent noise and annoyance to the residents of the neighbourhood in which the works and the Contractor's depots are situated and all machinery must be of such design and so arranged to be compliant with the pollution control requirements.

(e) In the event of generators, air compressors or pneumatic tools being used on the Works, the Contractor shall, arrange for such generator, compressors or tools to be fitted with silencers of approved design or adopt other means approved by the Engineer for the purpose of complying with Environmental Legislations. It shall be obligatory for the Contractor to demonstrate full compliance with the Environment Protection Act and Rules at his cost.

(f) No extra claim from the Contractor will be entertained on account of any extra charge for work or expense incurred in complying with the requirements of this clause

B.1.18 Continuous working

If, in the opinion of the Engineer, it is deemed necessary, by reason of the procedural requirements, safety of the works, or for the restoration of interrupted services, or for any other reason whatever, the Contractor shall, when so ordered, carry out the Works or any portion thereof continuously by day and by night without extra charge.

B.1.19 Drain and water-course

The Contractor shall level and clear undergrowth and also provide for the temporary diversion of such existing drains, water courses or land springs as are interfered with during the progress of the works. Any drains or water courses so diverted must be reconstructed in their original positions at contractor's cost on completion of the works. Where drains or water courses are met with, the Contractor will be responsible for keeping these free of excavated material and ensuring the free flow of water.

B.1.20 Anti-pollution and mosquito control

The site and working areas shall be maintained at the Contractor expense in accordance with current existing regulations governing anti-pollution and mosquito control.

B.1.21 Speed of excavation of shafts and pipe laying

The Contractor shall endeavour to so arrange his work that the rate of laying of the pipelines keeps pace with the rate of excavation of shafts without unduly affecting the progress of the overall work. The number of shaft excavations concurrently in progress shall be such that least interference is caused to traffic or pedestrians.

B.1.22 Safeguarding properties adjacent To Site

(a) Where work is undertaken near or adjacent to buildings and in the opinion of the Engineer, the stability of such buildings is liable to be affected as a result of the work, he shall arrange to have such buildings inspected and to have record of any cracks or any other defects which may be affected by the work. Every precaution should be taken by the Contractor to safeguard such building or structure and they should be to the complete satisfaction of the Engineer. The Contractor may be directed by the Engineer to excavate in such lengths of excavation as will permit the least amount to be opened at one time in order to minimise the danger of such open excavation affecting the stability of buildings or their supports. Such inspections shall be carried out before commencement of work & the inspection report shall be jointly signed by the contractor & the engineer.

(b) The Contractor will be held responsible for damage to public, private or other buildings and properties adjacent to the site of the works which is caused as a direct or indirect result of the Contractor's work. Should the Contractor fail to take the necessary precautions the Engineer may carry out such work as may be necessary at Contractor's risk and cost.

(c) The Contractor must take due care to identify and safeguard all existing services, such as water, sewer or gas mains, electricity, optical fibre and telephone cables and ducts, sufficiently in advance of the Works. The Contractor shall notify the Engineer of any mains, pipes or conduits met which in trial pits or excavation and shall take steps to support and protect these to the satisfaction of the Engineer. The Contractor will be responsible for any damage done to mains, cables, culverts and other services, inside or outside the excavation as a result of earth movement, faulty timbering / shoring, excessive weight of excavated material being deposited too close to open trench or shaft, leaving the excavation open for an unduly long period or to any form of settlement following backfilling.

(d) No work done by the Engineer or his workmen nor the fact that the shoring / timbering has complied with this Specification or requirements of the Engineer nor the approval of proposed or completed shoring / timbering etc, by the Engineer shall absolve the Contractor from his responsibilities and he will be required to make good any damage caused at his risk and cost.

(e) Furthermore, the Contractor is required to comply with any other safety and fire regulations that may be introduced from time to time.

(f) The Contractor shall note that in some of the work packages the work is to be carried below existing structures. Special precaution shall be taken by the Contractors at his cost for prevention of any damage to the structures affected by the tunnel drive.

B.1.23 Method of working

The Contractor is required to carry out the Works in the manner detailed herein, shown on the drawings and normally adopted. He is at liberty to supply with his Bid such modification as he proposes for consideration and shall seek approval from the Engineer before he is allowed to apply new or changed methods of construction. For this reason the bidder shall submit his method statement giving full particulars of various aspects as given below:-

- a) Equipment proposed to be used giving diameter of equipment, maximum torque, face pressure and jacking force, bentonite arrangement, cutter disk arrangement and types, rock cutting ability, slurry circuit particulars, weight of equipment, upsizing implications etc.

- b) Availability of the number of microtunneling equipment in his possession which can be brought to the work site within three weeks of issue of work order/ acceptance letter. Please note that if the bidder is unable to assure availability of at one MTBMs onsite within four weeks of issue of the acceptance letter his bid shall be liable to be rejected.
- c) Method of sequentially transferring the connections to newly laid line giving approximate duration of activities and
- d) Methods and design for shaft construction
- e) Rescue methods / remedial measures
- f) Access roads / arrangements

Notwithstanding any Specification, approval of decision given by the Engineer as to the carrying out of the Works, the Contractor will be wholly liable for the safety of the works, both temporary and permanent and for the completion of the Contract to the satisfaction of the Engineer.

B.1.24 Concreting programme

- (a) For concrete and reinforced concrete structures, a fully detailed and explained programme of concreting must be submitted and approved by the Engineer before work may proceed.
- (b) The programme shall indicate and/or take cognizance of the method of timbering, levels of struts and frames, arrangement of reinforcement, construction joints and the proposed plant and methods of concreting to be used.
- (c) All concreting in excess of 1 CuM at a time shall be done using Ready Mix Concrete from a supplier approved by the Engineer. In case of Ready Mix concrete supplies the contractor shall take at least 3 cube samples for testing in an approved laboratory. The Ready mix supply of concrete shall indicate complete details about the concrete supplied such as its grade, cement content, water cement ratio, slump, grading of aggregates etc. along with the delivery challan.

B.1.25 Protection of work

The Contractor shall, at his own expense, protect all work liable to damage either by the weather or by the method adopted for the execution of the Works, cover up, water and protect all work requiring the use of cement. The Contractor's attention is drawn to the risk of damage to structures due to temperature expansion and contraction and he will be required to protect all materials subject to damage from the direct rays of the sun.

B.1.26 Demolition and making good

- (a) The Contractor shall take care when demolishing or cutting away existing work that no adjacent work is unnecessarily damaged in any way. Any work so damaged will be made good entirely at the expense of the Contractor.
- (b) Old materials may not be re-used in the new work, except where so specified or as directed by the Engineer.
- (c) Exposed raw faces of existing concrete or brickwork which will not have new work built on them will be made good with cement rendering or new brickwork and finished to a neat, straight, vertical or plane surface in harmony with the adjoining surface.

B.1.27 Structural Test

- (a) The Engineer may instruct the Contractor to make a loading test on the Works or any part thereof if in the Engineer's opinion such a test is necessary.
- (b) If the test is made solely or in part for the reason that the "site made" concrete cubes fail to attain the specified strength, the test will be made at the Contractor's own cost.
- (c) If the result of the test is not satisfactory, the Engineer shall instruct that the part or whole of the affected Works concerned be taken down or cut out and reconstructed to comply with this Specification, or that other measures be taken to make the Works secure. The Contractor shall at his own cost take down or cut out and reconstruct the defective work or shall execute remedial measures as instructed.

B.1.28 Water tightness

All water retaining structures must be absolutely watertight showing no leakage or dampness through any concrete or joint. Any leakage or dampness evident on completion of the work must be remedied by an approved method at the Contractors expense.

B.1.29 Prevention of floatation

- (a) The Contractor's warned that the structures may not be heavy enough to resist the possible uplift due to water pressure until the structure, soil cover and backfilling have been completed. The Contractor shall make adequate arrangements to keep the excavation dry until the structure and filling are complete or shall adopt other approved means of ensuring the stability of the temporary or permanent works. His proposed method must be submitted to the Engineer for

approval before work is commenced and he shall provide for adequate standby plant and attendance throughout 24 hours each day.

(b) For pipelines laid in wet, waterlogged or ground subject to flooding all necessary precautions must be taken to prevent the flotation or movement of pipelines whether laying, laid or under test.

(c) Pipes are to be laid as carrier pipe inside sleeve pipe laid by Microtunneling & Pipe jacking method. Thus carrier pipe support arrangement as approved by engineer shall be made for which no extra payment shall be made.

B.1.30 Inspection and Replacement of Defective Work

(a) At any time during or after the execution of the Works the Contractor shall, at the request of the Engineer and within such time as the Engineer shall name, open for inspection any work covered up and should the Contractor refuse or neglect to comply with such request, he shall employ other workmen to open up same.

(b) If the said work has been covered up in contravention of the Engineer's instructions, or if on being opened up it be found not in accordance with the Drawings, Specification and Bills of Quantities or the instructions of the Engineer, the expenses of such opening and covering it up again, whether done by the Contractor or such other workmen, will be borne by and is recoverable from the Contractor.

(c) Wherever in the opinion of the Engineer the work done is inadequate or of poor workmanship or inferior materials or in any way sub-standard such works will be demolished, cut out and removed from the Works immediately and replaced with new materials of the required standard and quality at the Contractor's risk and cost.

B.1.31 Taking photographs.

Contractor at his own cost shall take, print, supply album of photographs (Two sets) in an album during the construction work in progress. The photographs shall be submitted fortnightly or as directed by the Engineer. No extra payment shall be admissible for this requirement.

B.1.32 CCTV Survey

It is mandatory for the contractor to carry out CC TV Survey including submission of two soft copies & two hard copies to the Engineer after completion of particular drive / work along with Roboholes or as directed by the Engineer. No extra payment shall be admissible for this requirement

B.1.33 Protocol of each Drive

After completion of particular drive / work or as directed by the Engineer, Contractor shall submit within five days a proper & authentic 'PROTOCOL' (both soft & hard copy) of Microtunneling machinery for that particular drive / work, to the Engineer. Protocol must reflect date time, length, various pressures of main jacks, steering jack's extensions, cutter head torque & face pressure, slurry & feeder pumps-flow rate, pump pressures, deviations in vertical & horizontal alignment, roll, pitch etc. No extra payment shall be admissible for this requirement.

PART 2 - MATERIALS AND WORKMANSHIP

B.2.1 General Requirement

B.2.1.3 Standards

Except as otherwise stipulated in this Specification and in the BMC's Standard Specifications, all materials and workmanship shall comply in all respects with requirements of such standard and specifications, codes and other standards issued by the Bureau of Indian Standards (BIS) and current at the date of bid as may be applicable to any part of the Works of this Contract. In the event there being no relevant Indian Standard Specification, other relevant standard, specification, current at the date of bidding such as the British Standards Institution, American Society for Testing Materials (ASTM), German Standards (DIN), Japanese Standard for Water and Sewerage (JSWAS), Standard Association of Australia (AS), or Singapore Standards (SS) and or of the or any other equivalent standard approved by the Engineer shall apply. If after the date of invitation to Bid there is an amendment to a standard specification relevant to the Contract, the Engineer will direct whether the amendment is to apply.

If in case relevant IS specification is not available, the Contractor shall obtain specific permission from the Engineer for use of any other Standard or Code of Practice followed in other country. He shall supply authenticated copy of such standard or code to the Engineer along with his request for the permission.

In the event of there being any conflict between this Specification, the Drawings and any Standard Specification forming part of this Contract, this Specification shall take precedence over the drawing, BMC's Standard Specification, codes and other standards in that order of precedence.

Materials and workmanship shall comply with the relevant Indian Standards (with up to date amendments) current at the thirty-first day of December of the year preceding the Bid Date, unless a more recent amendment is specified hereinafter, or with the requirements of any other authoritative standard approved by the Engineer which shall be no less exacting in the opinion of the Engineer than the corresponding standard quoted herein.

Where the relevant standard provided for the furnishing of a certificate to the purchaser, at his request, stating that the materials supplied comply in all respects with the standard, the Contractor shall obtain the certificate and forward it to the Engineer.

If no standard is indicated, the relevant Indian Standard, if any, shall apply. Indian Standard are published by:-

Bureau of Indian Standards

ManakBhavan

9, Bahadur Shah Zafar Marg

New Delhi - 110 002

The Contractor shall supply the Engineer with a legal copy of the standards referred in these specifications or any standards he intends to apply for the work without any extra cost.

B.2.2 EARTH WORKS/ EXCAVATION

B.2.2.1 Applicable Codes

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

- a. IS – 783 Code of practice for laying concrete pipes
- b. IS – 1200 Method of Measurement of Building Works.
(Part I to Part XXV)
- c. IS – 3764 Safety Code for Excavation Work.

B.2.2.2 Excavation in general

The Contractor shall provide adequate and secure shoring system to the excavations. It shall be ensured that the struts or any other member of the shoring system does not interfere with any of the operations like pipe handling, installation of equipment etc. Safety of the shoring crib shall not be compromised due to removal of any of the members of shoring system.

B.2.2.3 Dewatering

The excavations shall be kept free of water by deploying a suitable pumping system which shall be kept in operation for any duration of time as needed, for which no extra payment shall be admissible for this requirement.

Precaution shall be taken to prevent quick sand phenomenon or piping action resulting in washing out of fine particles thereby endangering the shoring system.

B.2.2.4 Excavation in rock

The Contractors shall note that the work involves excavation in extraordinary hard rock. The Contractor may have to use specialized equipment like hydraulic splitter for excavation in rock.

Blasting shall not be permitted under any circumstances..

B.2.3 CONCRETE AND ALLIED WORKS

B.2.3.1 Scope

This specification covers the general requirements for concrete to be used on jobs on-site production facilities including requirements in regard to the quality, handling storage of ingredients, proportioning, batching, mixing and testing of concrete and also requirements in regard to the quality, storage, bending and fixing of reinforcement. This also covers the transportation of concrete from the mixer to the place of the final deposit and the placing, curing, protecting, repairing and furnishing of concrete.

B.2.3.2 Applicable Codes and Specifications

The following specifications, codes of practice, referred to herein shall be the latest editions including all applicable official amendments and revisions.

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

B.2.3.2.1 Material

- (1) I.S. 269 Specification for ordinary and low heat portland cement
- (2) I.S. 455 Specification for portland slag cement.
- (3) I.S. 12330 Specification for Sulphate resisting Portland cements
- (4) I.S. 1489 Specification for portland- pozzolana cement.
- (5) I.S. 4031 Methods of physical tests for hydraulic cement.
- (6) I.S. 650 Specification for standard sand used for testing of cement.
- (7) I.S. 383 Specification for coarse and fine aggregates form natural sources for concrete.
- (8) I.S. 516 Methods of test for aggregates for concrete.
- (9) I.S. 516 Method of test for strength of concrete.
- (10) I.S. 1786 Cold worked steel high strength deformed bars for concrete reinforcement
- (11) I.S. 1199 Method sampling and analysis of concrete.
- (12) I.S. 3025 Methods of sampling and test (physical and chemical) for water used in industry.
- (13) I.S. 432 Specification for mild steel and medium tensile steel (Parts I & II) bars and hard drawn steel wire for concrete reinforcement.
- (14) I.S. 1566 Specification for hard drawn steel wire fabric for concrete reinforcement.
- (15) I.S. 4990 Specification for plywood for concrete shuttering work.
- (16) I.S. 2645 Specification for integral cement waterproofing compounds.
- (17) B.S. 4461 Cold worked steel bars for the reinforcement of concrete.
- (18) I.S. 10262 Recommended guidelines for concrete mix design.
- (19) S.P. 23 Handbook on Concrete Mix.
- (20) I.S. 458 Specification for concrete pipes.
- (21) I.S. 226 Specification for structural steel (standard Quality)
- (22) I.S.14333 H. D. D. E.
- (23) I.S.12709 G.R.P.

B.2.3.2.2 Equipment

- (1) I.S. 1791 Specification for batch type concrete mixers.
- (2) I.S. 2438 Specification for roller pan mixer.
- (3) I.S. 2505 Specification for general requirements for concrete vibrators, immersion type.
- (4) I.S. 2506 Specification for screed board concrete vibrators.
- (5) I.S. 2514 Specification for concrete vibrating tables.
- (6) I.S. 3366 Specification for pan vibrators.
- (7) I.S. 4656 Specification for form vibrators concrete.
- (8) I.S. 2722 Specification for portable swing weigh batchers for concrete (single and double bucket type)
- (9) I.S. 2750 Specification for steel scaffoldings.

B.2.3.2.3 Codes of Practice

- (1) I.S. 456 Code of practice for plain and reinforced concrete.
- (2) I.S. 1343 Code of practice for prestressed concrete.
- (3) I.S. 457 Code of practice for general construction
- (4) I.S. 3370 Code of practice for concrete structures (Parts I to IV) for storage of liquids.
- (5) I.S. 3935 Code of practice for composite construction.
- (6) I.S. 3201 Criteria for design and construction of precast concrete trusses.
- (7) I.S. 2751 Code of practice for welding of mild steel plain and deformed bars used for reinforced concrete construction.
- (8) I.S. 2502 Code of practice for bending and fixing of bars for concrete reinforcement
- (9) I.S. 3558 Code of practice for use of immersion vibrators or consolidating concrete.
- (10) I.S. 3414 Code of practice for design and installation of joints in buildings
- (11) I.S. 4014 Code of practice for steel tubular scaffolding. (Parts I to II)
- (12) I.S. 2751 Code of practice for laying insitu cements concrete flooring.
- (13) I.S. 783 Code of practice for laying of concrete pipes
- (14) I.S. 7634 Code of practice for plastic pipe work

(15) I.S. 13916 Code of practice for installation of GRP pipe system

B.2.3.2.4 Construction Safety

I.S. 3696 Safety code for scaffolds and ladders.
(Parts I & II)

B.2.3.2.5 Measurement

I.S. 1200 Method of measurement of building works.
(Parts I to XXV)

In the event that state, city or other government bodies as well as IBRD/ World Bank have requirements more stringent than those set forth in this specification, such requirements shall be considered part of this specification and shall supersede this specification where applicable.

B.2.3.3 General

The quality of materials and method and control of manufacture and transportation of all concrete work irrespective of mix, whether reinforced or otherwise, shall conform to the applicable portions of this specification.

Engineer shall have the right to inspect the source/s of material/s, the concrete batching and mixing equipment, and the quality control system. Such an inspection shall be arranged and Engineer's approval obtained, prior to starting of concrete work.

B.2.3.4 Ready Mix for concrete

If the quantity of Concrete needed for the work at site is more than 1 CuM, only ready mix concrete of required grade from an approved BMC supplier shall be used or the contractors must have his own batch mixing plant.

B.3.0 REINSTATEMENT OF SURFACES

In general all guidelines contained in for BMC as per recommendations of Merani Committee and of MORTH specifications of IRC shall be followed for reinstatement as applicable. It shall be incumbent upon the bidders to get a copy of these guidelines from the M.C.G.M. and acquaint themselves with the same before bidding for the work.

The Contractor shall restore the surface at the work locations including any pits i.e. jacking pit, receiving pit, rescue pit, to its original condition at the time of working; which may be in asphalt, mastic, cement concrete or paver blocks.

While taking any pit / excavation in Cement Concrete pavement, first the straight joint must be cut at the perimeter of the pit, so as to avoid haphazard breaking of the pavement.

Minimum Test frequencies for quality control

Item	Test	Control Criterion	Frequency
Cement	Physical, soundness and chemical test	Relevant IS	Once for each source of supply for approval of the source and subsequently for every batch to be tested at MTL
	Initial & Final Setting time, Strength	IS : 516, 1199, 8112	for each lot / batch of cement received to be tested at MTL
Coarse & fine aggregates	==do== (including soundness & alkali reactivity)	IS : 383	Once for each source to be tested at MTL
	Gradation, Moisture content	IS : 383	Regularly as required at site lab
	Los Angeles	IS : 383	Once for every change of source at MTL
	Abrasion Value		
	Aggregate impact value		
	Specify gravity		
Flakiness / Elongation Index	--do---	--do---	
Water	Chemical Test	IS : 456, 3025	Once for every change of source at MTL
Tor & Mild Steel Reinforcement	Yield stress, Ultimate Tensile stress, % Elongation	IS : 432, 1566	for each lot of steel received at MTL
Bricks	Strength & water absorption		Once for each source at MTL
Concrete for site work / for casting NP-4 class RCC jacking pipe	Workability		One per Batch at site / pipe casting yard
	Concrete strength		Six Cube samples, 3 each for 7 days and 28 days test for every days work at site lab / Pipe manufacturing unit. At least 10% samples shall be sent to MTL for 28 days test.

RCC Jacking pipe of NP-4 class	Three edge bearing test, Dimension test	IS-458 & IS 3597	One test for every 75 pipes or part thereof for each diameter at Lab at pipe manufacturing unit or at any Institution as directed by the Engineer
CC Paver Blocks – 60, 80, 100 mm	Water absorption, Compressive strength, Tensile splitting, Abrasion		27 nos of paver blocks shall be sent for every 25000 nos of paver blocks at MTL
Granular Subbase	Gradation, Absorption, Lab CBR, Field Density	MORTH	For every days work at site lab.
Wet Mix Macadam	Gradation, Moisture Content, Absorption, Lab CBR, Field Density	MORTH	For every days work at site lab.
Bituminous Macadam / Seal Coat / Bituminous Concrete	Gradation, Bitumen content, Marshall Stability, Flow value, Voids etc.		One sample for every five loads at MTL

93 .Conflict Of Interest: The clause of conflict of interest is added at Sr No. 83 in GCC Section .

94. Firms/Tenders not eligible to submit Tender

I) (a) Tenderer/ Contractual Agency not eligible to participate in tender process.

(i) Any Tenderer/ Contractual agency which is Debarred, Blacklisting, Demotion, Suspension, De-registration etc., as on date of invitation of tender by the BMC/ Govt./ Semi-Govt./ Public Undertaking Agency shall not be eligible for participating in the bidding process of the present tender.

(ii) Any Tenderer/ Contractual agency which is Debarred, Blacklisting, Demotion, Suspension, De-registration etc., as on date of invitation of tender by the World Bank, JICA or any other International Financing Institution, shall not be eligible for participating in the bidding process of the present tender.

(iii) Any Tenderer/ Contractual agency having failed to perform on any contract as on last date of submission of the tender as evidenced by imposition of a penalty by an arbitral or judicial Employer or a judicial pronouncement or arbitration award against the Tenderer/ Contractual Agency as the case may be. Non-performance/ failure to perform shall be based on all information on fully settled dispute or litigation that has been resolved in accordance with the dispute

resolution mechanism under the respective contract and where all the appeal instances available to the Tenderer/ Contractual agency have been exhausted.

(iv) As on last date of submission of tender, any Tenderer/ Contractual agency OR any of the JV Technology Provider associating with any Tenderer/ Contractual agency that has been expelled from any project or contract by any public entity.

(v) As on last date of submission of tender, any Tenderer/ Contractual agency OR any of the JV Technology Provider associating with any Tenderer/ Contractual agency that has or had any contract terminated by any public entity for breach by such Tenderer/ Contractual agency or any Party constituting the Tenderer/ Contractual agency.

(vi) Tenderer/ Contractual agency OR any of the JV Partners OR Technology Provider associating with any Tenderer/ Contractual agency shall not have been Debarred, Blacklisting, Demotion, Suspension, De- registration etc. as i and ii above.

(b) Government entities shall be eligible only if they can establish that

(i) They are legally and financially autonomous and

(ii) They operate under commercial law, and

(iii) They are not a dependent agency of the Employer

II) The Tenderer/ Contractual agency shall mandatory to submit a notarized undertaking on Rs. 200/- stamp paper regarding I(a). If Tenderer/ Contractual agency having action under III(a) above submits a tender by hiding these facts or providing incorrect information then they shall be liable for forfeiture of EMD and disqualification including other actions as per provisions of law.

95) Joint Venture (JV) is not allowed for this Bid.

96) In the event of failure of HDD method due to any adverse sub soil conditions meet with, the successful contractor shall complete that work by suitable improvised trenchless technology. However payment to that effect will be made as per items mentioned in BOQ and Mode of measurement.

97) Special Direction to the bidder

Geophysical subsurface investigation techniques shall be used to image the sub surface along the proposed alignment of sewer line. The process involves the acquisition of information on the surface and subsurface conditions along the alignment of proposed sewer line. The information shall be evaluated and interpreted for finalizing the sewer alignment to be laid by trenchless techniques. In a investigation programme, gathering all relevant and necessary information and maintaining accuracy of required information shall be the prime object. Contractor shall strictly adhere to the standard practice and systematic procedure oriented operation.

For this purpose, following techniques of Subsurface Investigations shall be adopted.

1. Subsurface Utility Engineering

2. Multi-Channel Analysis of Surface Waves (MASW) or Seismic Refraction Tomography (SRT) (to be chosen based on site condition).

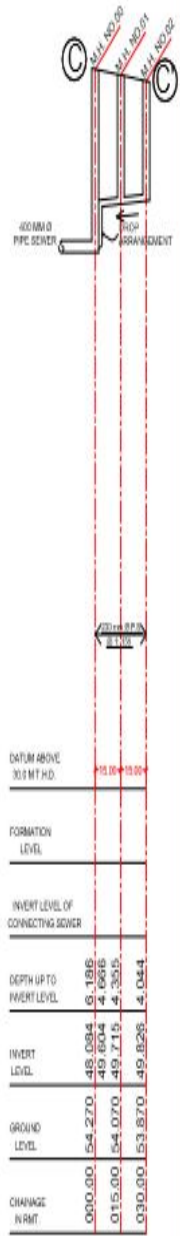
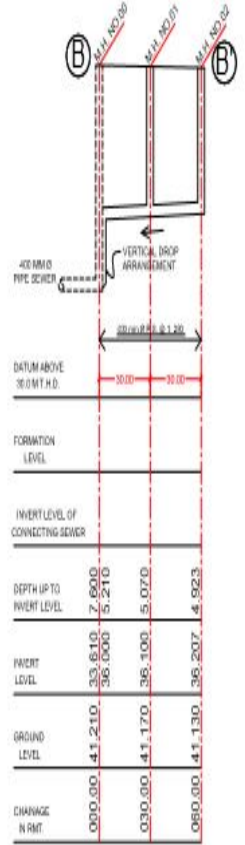
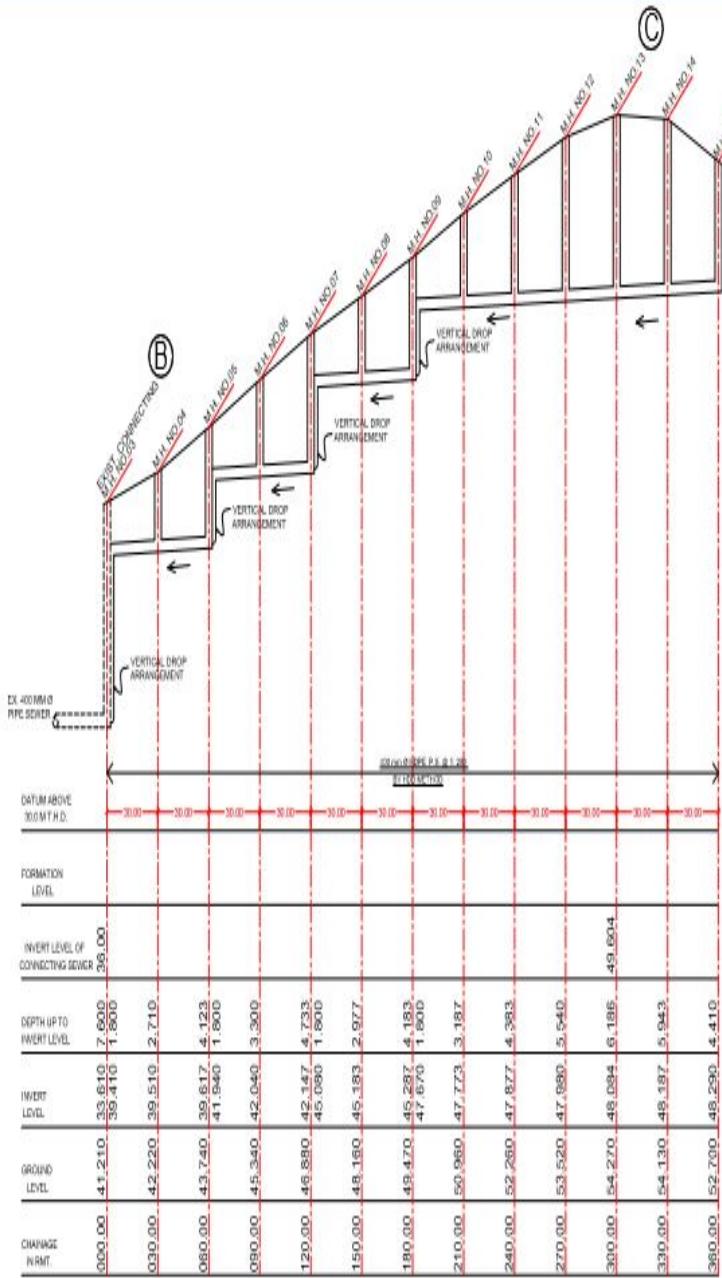
Contractor shall execute above techniques of Subsurface Investigations at his own expense strictly as per the SOP guidelines of Indian Society for Trenchless Technology (IndSTT) before finalizing the alignment of proposed sewer line and submit the report to the concerned Executive Engineer, no separate payment will be made by the BMC for the same.

SECTION 15

DRAWINGS

The drawings attached separately pertaining to the works can be inspected in the Office of the Dy.Ch.E. Sewerage project (Planning & Design) during the office hours.

Sr. No	Drawing No.	Description
1.	DY.CH.E./S/1155 DATE 29.07.2022	P/L 400 mm dia. (OD) HDPE pipe sewer line (PN-6 Class- PE 80 grade : IS 14333) to correct grade and alignment on North side of JVLR from W.E.H. to Pratap Nagar, Jogeshwari(E) in K/E Ward by HDD method
<p>NOTE – Drawing for Type design for typical Manholes, scraper manholes, chambers, standard R.C.C. ventilating shaft, site chowky and cement godown, design for providing barricade to trenches, proposed vertical drop arrangement with full encasement etc. are available to the office of : Chief Engineer (S.P.) Eng. Hub, Store Building, 2nd floor, Dr. E.Moses Road, Worli, Mumbai : 400 018</p>		



L-SECTION SCALE - V.H.R. - 1cm = 1.0 mt. H.R. - 1cm = 10.0 mt.



REVISED DRG. No. DY.CH.E./S(S)/1155 DATE -29.07.2022

BRIHANMUMBAI MUNICIPAL CORPORATION

PIL 400 MM DIA. (Ø) HDPE PIPE SEWER LINE (PN-4 CLASS PE 80 GRADE IS 14333) TO CORRECT GRADE AND ALIGNMENT ON NORTH SIDE OF JOGESHWARI VIKHROLI LINK ROAD FROM WESTERN EXPRESS HIGHWAY TO PRATAP NAGAR AT JOGESHWARI EAST IN "K" EAST WARD. BY HDD METHOD.

DEALT BY CHKD. BY SCALE: AS SHOWN / DRG. No. DY.CH.E./S(S)/1155 DATE -29.08.2019

DAMODAR JACHAV TRACER	HEAD D/MAN	SUB. ENG. (S.P) P & D	ASST. ENG. (S.P) P & D	EX. ENG. (S.P) P & D	DY. CH. E. (S.P) P & D
-----------------------	------------	-----------------------	------------------------	----------------------	------------------------