TENDER SPECIFICATION

BHEL: PSSR: SCT: 1575

FOR

CONSTRUCTION OF CIVIL WORKS FOR 2x660MW AT ENNORE SEZ THERMAL POWER PROJECT AT ASH DYKE OF NORTH CHENNAI TPS, CHENNAI, TAMIL NADU

CORRIGENDUM-2, dt: 12/2/2015

CORRIGENDUM-2 - Consists of

- **BHEL's Clarification**
- **Revised Pre-Qualification Requirement(PQR)**
- **Revised Price bid**

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35

Tender Specification No. BHEL: PSSR: SCT: 1575

For

Construction of Civil, Structural and Architectural works including Piling, Ground improvement etc. in entire area, construction of RCC Chimney (twin flue 275M) & Natural Draft Cooling Tower (NDCT) for Unit-1&2 of 2 X 660 MW sets at Ennore SEZ Super Thermal Power Project at Ash dyke of North Chennai TPS, Chennai, TamilNadu

Corrigendum-2 to Tender Specification No. BHEL: PSSR: SCT: 1575- 2 copies

Issued to
M/s

Refer Corrigendum-1 for Last date of bid submission

All other conditions remain unchanged

For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

GENERAL MANAGER / HR&CONTRACTS

Place: Chennai -35
Date:

BHEL's clarifications are furnished below against some of the bidder's query sought vide letters/email or in Pre Bid discussion held on 30.01.2015 at BHEL PSSR in the tender BHEL PSSR SCT 1575 .

BHEL's CLARIFICATIONS TO TENDER NOTICE BHEL PSSR SCT 1575,dated:11/2/2015 **Annexure-1**

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
1	Cl 1.6.7.1, TCC	Schedule for individual buildings	Please provide the time schedule for different structures prepared by BHEL for information. Please also indicate the list of structures required for milestones such as lightup.		Bidder to follow the schedule given in TCC
2	Cl 1.7.2, TCC	Advance	We request that interest free advance be paid by BHEL. As the payment is secured and considering the large quantum of work in a tight schedule. Also considering the equiment mobilisation required for the project same may be favorably considered.		Tender prevails
3	Cl 1.7.1, TCC	Secured advance	We request that the secured advance for reinforcement steel, cement and structural steel be made atleast 95% considering that these suppliers require full payment in advance before delivery. Since the material is at site and hypothecated to BHEL, it is fully secured.		Tender prevails
4	Cl 1.7.2, TCC	Advance	Cooling tower being EPC package we request that interest free mobilisation advance of 10% be paid for this item.		Tender prevails
5	NIT , 1.0 Salient Features of NIT , (v)	Due date & time of offer submission	Considering the nature & volume of work involved, the time allocated for submission of bid is very less. We request you to kindly extent the bid submission date to **5th March 2015.** The extension will enable us in submitting a competitive offer to BHEL.		Corrigendum on time extension issued separately
6	Cl 1.2.2, TCC	Fabrication drawings	We understand that the preparation of fabrication drawings only is in Bidder scope and all design including connection design is done by BHEL. Please confirm.		Only basic engineering by BHEL. Preparation of fabrication drawing is in bidder scope.
7	Cl 1.3.7.5, TCC	Cement	Please clarify if OPC grade 53 can also be adopted for different structures. We also request you to accept PPC cement for works such as masonry works, plastering, paving and also lightly loaded structures. Considering the coastal nature of the site use of PPC provides advantages.		Tender prevails
8	TCC	Grouting	Supply and application of grouting for equipment foundations shall be in scope of equipment erection vendor and not part of civil works; if special grout material is required (other those listed in the Price schedule) same may be informed		Bidder to quote as per BOQ
9	Cl 1.6.4, TCC	Schedule	The overall schedule is provided as 35 months. Any specific activity/activities can be advanced with mutual agreement based on availability of fronts etc. But advancing the complete project as mentioned here would not be possible as it would require extra resources which requires compensation.		Contractor has to execute the project in line with the Project schedule/agreed schedule within the frame work of the time given in the contract.
10	Cl 1.6.4, TCC	Schedule	Please inform us what is the period of advancement envisaged here.		
11		Stop log gate and screen	Please clarify what drawing will be provided for these items. Will they be construction drawings?		Design is in bidder scope.Bidder to quote as per BOQ
12	Chimney specifications, 12.05.03	Wind tunnel testing	The wind tunnel testing of the chimney is not part of Bidder scope. Please confirm		Yes.
13	Data sheet A for cooling tower, BHEL spec PE-TS-412-165-N001	RH for cooling tower design	As per the Customer specification (Vol-II:2) the design relative humidity is 75%. This will be adopted for the NDCT design.		Bidders to consider Design Relative Humidity as 60%.
14	Vol-III, 376, Customer specifications	CT accessories	Items -quick fill, makeup piping, are not in Bidder scope as it will be done by BHEL in the common forebay portion. Please confirm		Noted & Confirmed.

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15	Lighting	Cooling tower area lghting	We understand that Bidder's scope includes only aviation lighting for the cooling tower and the area lighting in the cooling tower is not in scope of Bidder. Please confirm. Any emergency lighting (DC/UPS) are also not in scope of Bidder. Please confirm.		Deviation is not acceptable for lighting.Please follow specification. Please refer SLD for emergency lighting.One number emergency feeder shall be provided by BHEL at the incomer of aviation lighting panel.Further distribution is in Bidder's scope.
16	Cl 6.08.00, Sec C1, Sh 6/11, PE-TS-412-165-N001	Staircase	Staircase is provided upto hotwater distribution level. Ladder is provided upto cooling tower top for aviation warning lighting access as per standard practice and clause 6.09.00. Please confirm.		The Clause is refered for Aviation warning Lights (if any as per technical Specification) at Hot Water Distribution Level. Further details shall be discussed during Detailed Engineering.
17	Std electrical scope		In the NDCT electrical eqpt is limited to sump pumps and motor actuator for the butterfly valves in hot water riser. We request that the ACDB be provided by BHEL as the number of drives is negligible. Also the actuator is to be conttrolled from the control system, so MCC for this shalll be in BHEL scope. For the aviation lighting distribution board will be provided by the Bidder.		Deviation is not acceptable.Please follow specification.
18	Technical Conditions of Contract	Vol. 1A; 1.6.1.2	Time schedule for Ground Improvement works	We understand that time schedule for completion of total scope of works is 35 months from commencement of main works. Request to clarify us the time schedule for only ground improvement works & BCIS piling works.	8 months
19	Technical specification for Vibro displacement method	3.01.00	Stone aggregate for stone column works	Generally stone aggregate size of 40mm down aggregate is very much suitable for vibro displacement method (dry method) as mentioned in BoQ item 3004. However, 50mm down aggregate is mentioned in technical specification which is not suitable for this method. Request you change the same to 40mm and accordingly grading of aggregate shall be considered.	Bidder to quote in line with the BOQ
20	Technical specification for Vibro displacement method	6.02.01	Routine Plate Load Test	Generally, post ground improvement plate load test will be carried out as per IS 15284 Part 1. But Technical specification conforming IS 1888. Request you to consider IS 15284 and confirm the same.	Not accepted. Work shall be done as per specification.
21	Drawings		Drawings for Ground Improvement works	Please provide stone column layout plan and cross section drawings where ground improvement works need to be done.	Bidder to quote in line with BOQ. Drawings can be furnished only during execution.
22		Vol:VI, Page:104 Clause 13.05.01	Wind Load	The specification calls for a cyclonic risk factor to be considered as per IS:15498. IS:15498 suggests a cyclonic risk factor of 1.15 for industrial structures. It also says for special structures refer to respective codes. In NDCT code (IS) such a factor is required. As we are already considering Category-I in consideration of coastal location of the project as per specification which will address this issue. Therefore the requirement of this cyclonic risk factor may please be deleted.	Cyclonic risk factor to be considered as per IS:15498.
23		Page:106 Clause 13.06.00	Foundation	… uplift of the foundation, not exceeding 15 degrees is permitted…. BS code allows this uplift up to 30 degrees and which is the practice. Therefore we will limit up to 30 degrees Please confirm.	Bidder to quote as per technical bid
24		Page:107 Clause 13.07.00	Basin and cold water outlet	.....In any case, the basin slab shall not be used to give lateral resistant to piles below main tower shell structure..... As the design is governed by lateral resistance of piles the basin floor will be connected to take lateral resistance in case the basin floor is also designed with piles. The basin floor will be connected either fully or a part is connected as required in design. Please confirm.	Shall not be permitted.

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
25		Page:107 Clause 13.07.00	Basin and cold water outlet	paving of 7m wide around NDCT tower at one place and a plinth protection of 3m at another place is given which one to follow please confirm	paving of 7m wide around NDCT tower shall be provided
26		Page:110 Clause 13.11.02	Platforms	Instead of providing the external platform at top the shell will thickened suitably by providing 1.2 thickness which can be used as platform. Suitable handrail will be provided.	Bidder to comply Technical Specification.
27		General	Wind loading Provision of ribs	We propose to use aerodynamic rough surface such as by providing meridian ribs on the external face of the cooling tower as per VGB. The pressure coefficients as given VGB-BTR 610e would be followed after accounting for internal suction. However the intensification factor of 1.43 as stipulated in specification would be adhered. The mimum thcikness requirment of 250mm shall be maintained excluding ribs. Shell buckling and strength requirment shall be checked without considering the thickness of of ribs.	Not allowed. Wind pressure distribution as per IS11504 to be applied.
28		General		Considering the time schedule requirement the contractor shall be allowed to carryout piling activities for NDCT before the completion of wind tunnel testing.	Wind tunnel results to be available before taking up job piling activity.
29	NIT	Qualification Criteria – Annexure-3 B) 1.1 to 1.3	Technical Qualification Criteria: Bidder should have executed the following in India in the last seven years preceding the latest due date of bid submission. 1 Bidder should have executed the following in Power/Industrial projects 1.1 One (1) civil or civil and structural work of value not less than Rs 1030 crores (OR) 1.2 Two (2) civil or civil and structural works each of value not less than Rs 640 crores (OR) 1.3 Three (3) civil or civil and structural works each of value not less than Rs 510 crores	Under this clause, jobs executed separately under different work orders for the same work in the same project, can be combined and considered as one work for evaluation purpose. Does it mean that work packages under separate work orders for single client at same project site would also be considered as single project for evaluation purpose? Kindly confirm.	Refer revised Pre qualification Criteria
30	NIT	Qualification Criteria – Annexure-3 B) 2.1 & 2.3	2.1 Ground improvement work by installing at least 4,36,800 RM of stone columns/sand compaction piles within a period of eight months in any one contract or cumulative of two concurrent contracts in any projects. 2.2 Cast in situ RCC piles of at least 1,10,000 RM in any one contract or cumulative of two concurrent contracts. Also, the bidder should have installed at least .6,400 RM of bored cast in situ piles and at least 6,200 Rm of driven cast in situ piles in any one month, in any projects through one contract or cumulative of two concurrent contracts.	For fulfilling the requirement of stone columns/sand compaction piles, bored cast-in-situ piles and driven cast-in-situ piles, quantities calculated on prorata basis may kindly be considered as it is not possible to get a separate certificate indicating the monthly progress, from the client. We do posses the certificate having yearly production duly mentioned. Kindly confirm.	Agreed
31	NIT	Qualification Criteria – Annexure-3 B-1 - Sl. No. 4.0	In case consortium bidding is allowed as per pre-qualifying requirement, then the prime bidder and consortium partner(s) . . . . bids of such prime bidders will be rejected.	As per this clause the second partner is allowed to enter into a consortium with multiple agencies. Normally the consortium partner is a legally bound entity and should not be allowed to enter into an agreement for the same project with any other party. By allowing the consortium partner to do so, the basic purpose of consortium is defeated, we request that instead of consortium the prime bidder may be allowed to engage a sub-contractor for a portion for which prime bidder is not himself qualified. Under these circumstances, Sr. No. 9 under Consortium Conditions, may kindly be deleted as the Prime bidder will be completely responsible for the completion of the project. Kindly confirm.	Tender prevails

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
32	NIT	Qualification Criteria – Annexure-3 B-1 - Sl. No. 10.0	The consortium partner(s) shall submit additional EMD to BHEL as under along with the offer in addition to the EMD to be furnished by the Prime bidder 1. For ground improvement Rs 2 Crore. 2. For RCC Chimney Rs 1.60 Crore. 3. For NDCT Rs 4.30 Crore. The prime bidder/standalone bidder shall submit EMD to BHEL for Rs 20 Crores along with the offer. The bidders have one time EMD with PSSR also have to submit this.	It would neither be expedient nor possible for any consortium partner or any sub-contractor to provide EMD at the time of bidding. Instead of EMD (Additional Performance Guarantee) of similar amount may be taken from the sub-contractor, after award of the work. Kindly confirm.	Tender prevails
33	NIT	Annexure -5 Performance certificate	PERFORMANCE CERTIFICATE Performance certificate to be submitted by bidders including consortium partners who have not been working with any of the four BHEL Regions in the last 12 months prior to the latest date of bid submission. . . .	We request you to not to ask for the certificate as it would not be possible for us / our consortium partners to get such certificate from the client. It will be very difficult for clients to quantify the performance of the contractors. Comprehensive certificate indicating the performance of a contractor issued by our clients are already with us / our consortium partners which indicates the performance, the resources and financial capability of the contractor. Additionally, we / our consortium partners shall be ready to give an Undertaking to BHEL authorizing their representative to seek additional information with regard to our performance from our clients. Kindly confirm.	Tender prevails
34	NIT	Annexure-8	Certificate by Charted Accountant on letter head	Since our company is a limited company and listed in Stock Exchange, this certificate may not be required to be produced by us. Kindly confirm.	Annexure-8 is applicable to only MSME vendors.
35	Notice Inviting Tender	Annexure -3, Cl-1, page 24	Bidder should have executed the civil, structural, piling/ ground improvement works under power/ industrial projects.	Please clarify whether all these types of works including piling, ground improvement works, (stone columns, compaction piles etc.) carried out in sectors other than power and industrual projects such as port works, container terminal projects etc. shall be admissible.	Refer revised Pre qualification Criteria
36	TCC/VOL-IA	PART – I/ CH-VII/CL.1.7.2	Interest bearing advance for Mobilization . . . . will be paid against submission of bank guarantee . . .	We request you to release the mobilisation advance as Interest free.	Tender prevails
37				We request you to provide us the present rate of interest for Mobilisation Advance and also confirm us the interest rate shall be uniform for this work.	Tender prevails
38	TCC/VOL-IA	PART – I/ CH-VII/CL.1.7.2	Interest bearing advance for Mobilization, limited to 5% of the contract value will be paid . . . . which will be recovered from the first running bill onwards.	We request you amend the value as 10% of the contract value and recovery of the same should start after 4th Running Bill.	Tender prevails
39	General Conditions of Contract	2.7.9	Max. Ceiling limit for Liquidated damage is 10% of the contract value for the project.	We request you to amend the maximum limit to 5% of the contract value for the project, as most of the PSUs are considering the ceiling limit as 5%.	Tender prevails
40	TCC/VOL-IA	PART – I/CH-III/CL. 1.3.6	Supply / providing cement, aggregate, sand, Hand Rail, Stainless Steel, Roof sheets, Rails, MS rods, MS flats, Reinforcement steel (TMT) & structural steel . . . are in the scope of the contractor.	We presume that all materials required for completion of this packafe will be in contractor's scope except reinforcement steel (TMT) (around 7000 MT), which will be charged @Rs.46,158/- per MT. Please confirm.	Yes.
41	TCC/VOL-IA	PART – I/CH-III/CL. 1.3.6	In the event of BHEL supplying the material, the cost towards material supply shall be recovered from the agency as below 1. Reinforcement steel TMT : Rs 46158/- per MT 2. Structural Plates : Rs 48700/- per MT 3. Structural Plates : Rs 48700/- per MT 4. Structural Steel : Channel Section : 47367/- per MT 5. Structural Steel : Beam Section : 49870/- per MT 6. Structural Steel : Beam Section : 46012/- per MT	Kindly confirm us the mentioned rates are inclusive of all taxes & duties.	Yes.
42	TCC/VOL-IA	PART – I/ CH-III/CL.1.3.5	Construction Water	We request you to provide Construction Water at single point free of cost within site premises. Please confirm.	Tender prevails
43				We presume that Construction Water will be charged @ Rs.66/- per 1,000 Litres including all taxes & duties. Please confirm.	Tender prevails. Charges are tax inclusive.

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44	TCC/VOL-IA	PART – I/ CH-III/CL.1.3.4	Construction Power	We request you to provide Construction Power at single point free of cost within site premises. Please confirm.	Clause 1.3.4.1 to be read as Construction power will be provided to the contractor on chargeable basis at the applicable rate of TNEB under LT tariff V at the nearest substation, which includes Current consumption charges, fixed charges, Load Power factor and elecriticity Tax as appicable as per tarrif V. The TNEB tariff and tax may vary from time to time. The required Energy meter for measuring the consumption shall be provided and installed by the contractor. Any dispute regarding consumption, the BHEL engineer's decision is final.
45				We presume that Construction Power will be charged @ Rs.7/-+5% per unit including all taxes & duties. Please confirm. Also request to confirm the "Fixed charges" as mentioned in the document.	
46	TCC/VOL-IA	PART – II/ CH-I/Sl No: 3.2.9.3	The total amount of PVC shall not exceed 20% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary / Additional Items and Extra works.	We request you to make payment aganist PVC celing free.	Tender prevails
47	TCC/VOL-IA		PRICE VARIATION COMPENSATION for LABOUR, HIGH SPEED DIESEL OIL, and MATERIALS	We request you to pay PVC for LABOUR, HIGH SPEED DIESEL OIL, and MATERIALS for the entire original contract period and extended period if any.	Tender prevails
48	General Condition			Please confirm us the number of copy / ies of Techno-comeercial & Price Bid to be submitted for this package.	1 set
49	General Condition			Kindly confirm the tax benefits / exemtions against this project as SEZ.	This project does not come under SEZ.
50	TCC/VOL-IA	PART – I / CH-VII/ Cl. 1.7.5 Payment Terms	The Balance 5% of the item rate / lumpsum rate shall be released as under after completion of all works & on completion of material reconciliation and certified by BHEL Engineer.	We earnestly request you to allow us to submit Retention-Cum-Performance Guarantee for the job of 5% of the contract value in the form of Bank Guarantee valid till DLP during the execution period and hence no cash deduction shall be made from our monthly R.A. Bills on this account.	Tender prevails
51	General Condition	PART – I/ CH-II/CL.1.2.3	The area of work shall be cleared of all vegetation, rubbish and other objectionable matter and materials removed . . . . included in the unit rates rendered for the different items under bill of quantities.	We request you to kindly provide the levelled ground with free of vegetation, rubbish and other objectionable matter.	Site is filled with ash and levelled to some extent. As such no filling envisaged. Bidder to take care for movement of rigs.
52	General Condition	PART – I/ CH-II/CL.1.3.3	BHEL will provide open space for office construction, stores construction as made available by the customer free of hire charges . . . . area within plant premises for fabrication, batching plant, office, storage area etc. for construction purpose shall be provided as per availability free of cost . . . . Contractor has to make his own arrangements for labour colony	We request you to provide the land for Labour colony at free of cost. Please confirm.	Tender prevails
53	General Condition			Please confirm the area available for laydown within plant boundary. Also request you to provide us the key plan indicating the distances of various locations (viz. Steel yard & site, Site and laydown area / Batching Plant etc.)	Yes. Laydown area will be provided within the plant boundary. During the execution the area will be alloted.
54	VOLUME - 2 PRICE BID			We request you to allow us to submit our Price Bid in printed formas there are many items and space for writing is insufficient. Please confirm.	All other details viz item description, quantity,unit of measurement in BHEL issued price bid is binding on the bidder in case of submitting the printed formats by the bidders
55	TCC/VOL-IA	PART – II / CH –II FORMATS (revised)	BANK GUARANTEE FOR BID MARGIN/EMD.	Please provide us the value of stamp duty for executing the EMD & also the beneficiary name. Also request you to confirm us whether is any list of suggestive bank for executing the bank Guarantee.	Tender prevails

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56	NIT	Sl.No.10	The consortium partner(s) shall submit additional EMD to BHEL as	We understand that Prime bidder can submit additional BG required from the consortium partner against EMD. Please confirm.	Tender prevails
57	TENDER NOTIFICATION		Last date of submission of Bid is scheduled on 10-02-2015.	Considering the scope of work, we earnestly request you to extend the due date for submission of tender bids by atleast 01 month after receiving of last Addendum / clarification / errata.	Corrigendum on time extension issued separately
58	TCC/VOL-IA	PART – I/ CH-VII/CL.1.8.4 Other Taxes & Levies	1.8.4.1 Any other taxes and duties (except VAT & Service Tax) if any, as applicable, viz. Entry Tax, Octroi, Licenses, Deposits, Royalty, Stamp Duty, other charges / levies, etc. prevailing / applicable on the date of opening of technical bids and any variation thereof during the tenure of the contract are in the scope of bidder. In case BHEL is forced to pay any such taxes, BHEL shall have the right to recover the same from the bidder either from running bills or otherwise as deemed fit.	We request you to kindly reimburse the difference in case of any variation for all other taxes and duties (including VAT & Service Tax) if any, as applicable, viz. Entry Tax, Octroi, Licenses, Deposits, Royalty, Stamp Duty, other charges / levies, etc. at actual on submission of documentary proof of payment. Please confirm.	Clause stands. Variations to Bidder's account only.
59	TCC/VOL-IA	PART – I/ CH-III/CL.1.3.1.3.2.1	Construction Water Making the water available at single point	We request you to provide us Water at least two points (Each at batching Plant & Construction site)	Tender prevails. Charges are tax inclusive.
60	TCC/VOL-IA	PART – I/ CH-III/CL.1.3.1.2.1.1	Construction Power Single point source	We request you to provide us Power at least three points (One at batching Plant & two at Construction site)	Tender prevails
61	TCC/VOL-IA	PART – I/ CH-VII/ CL. 1.7.1 Secured Advance	Interest free secured advance up to maximum of 75% of the value of materials (landing cost at site) for Reinforcement steel, Structural steel, Stainless plate, cement, stone aggregate required for incorporation in permanent work shall be paid for which necessary hypothecation deed to be furnished by the bidder to BHEL. The secured advance shall be adjusted in the interim bills prorated to the materials incorporated in the work and billed.	We request you to amend the clasue as mentioned hereunder: Interest free secured advance up to maximum of 75% of the value of materials (landing cost at site) for Reinforcement steel, Structural steel, Stainless plate, cement, metal sheet, Grating, stone aggregate, all other finishing items etc required for incorporation in permanent work shall be paid for which necessary hypothecation deed to be furnished by the bidder to BHEL. The secured advance shall be adjusted in the interim bills prorated to the materials incorporated in the work and billed. Please confirm.	Tender prevails
62	TCC/VOL-IA	PART – I/ CH-III/CL.1.3.7.3	The list of approved vendors for supply of structural and reinforcement steel is given below :	We request you to kindly incorporate "Rashtriya Ispat Nigam Limited (RINL)" as apporved vendor for supply of structural and reinforcement steel. Please confirm.	Refer TCC clarification
63	TCC/VOL-IA	PART – I/ CH-IV/CL.1.4.2 List of minimum major T&P, Item B3 & B5.	Bidder to mobilise hydraulic rigs for installation of driven cast-in-situ piles and compaction piles.	Bidder shall have the option to deploy either pneumatic/ diesel hammer together with appropriate capacity crane or a drop hammer operated by diesel operated winch attached to a standard driven piling rig or a combination of both at the discretion of the bidder for installation of driven cast-in-situ pile and compaction piles. Please confirm.	Bidder to follow the note given in the clause of T&P.
64	TCC/VOL-IA	Cl.1.2.3, Page 42	The area of work shall be clear of all vegetation, rubbish and other objectionable matters and the materials removed shall be burnt/ disposed of and no separate payment for this operation shall be made and cost of these operation shall be deemed to be included in the unit rates quoted in the BOQ.	A separate item (ST No.2601 in Package 2 - BOQ has been specifically included in the BOQ for Package 2 (Civil and structural works) for earth work stripping including clearing of vegetation, debris etc. Please confirm all the works pertaining to clearing of vegetation, rubbish, debris etc.shall be measured and paid under this item and clause no.1.2.3 of TCC shall be considered as deleted.	Refer TCC clarification
65	TCC/VOL-IA	Cl.1.3.6.1, Page 50	BHEL shall provide only steel reinforcement (around 7,000 MT) for incorporation mostly for piling and pile cap work on chargeable basis at a basic rate of Rs.46,158/- per mt as per Clause 1.3.6.2.	* Please furnish the details of steel reinforcement in piles separately.	Tender prevails
66				* The total quantity of steel reinforcement in the BOQ as per Item no.401 & 402 of BOQ for Package 2 is 29497mt whereas only around 7000mt shall be provided by BHEL on chargeable basis. In this context, please clarify (i) whether the balance quantity is required to be procured by the Bidder ? (ii) If so, whether the indicated basic rate of Rs.46,158/- shall be applicable for quantity of steel reinforcement to be procured by the bidder and any variation (+) shall be payable/ deductable at actuals.	Tender prevails
67	General Condition			Please provide us the soft copy of the BOQ in excel format.	In case of submitting the printed formats by the bidders,all other details viz item description, quantity,unit of measurement in BHEL issued price bid is binding on the bidder

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68	General Condition			We request you to provide list of approved makes / manufacturer for BOIs.	Bidder to quote as per BOQ and TCC clause 1.3.6.1
69	TCC/VOL-IA	PART – II/ CHA –III/ Drawings		We request you to provide us some additional drawings for this package for better understanding.	Not available
70	Volume-VI(A)		COAL HANDLING SYSTEM	We understand that Coal handling Plant (Internal & External) is not included in the scope of this tender. Please confirm.	Scope of the bidder as given in the clause 1.2 of TCC
71	VOLUME - 2 PRICE BID	Item No. 920	Roof skylight structure for atrium with 6mm thick Polycarbonate shee. . . all complete as per detailed drawing and specification.	Please provide us the GA, Architectural & Arrangement drawings for this item.	Bidder to quote as per BOQ
72	VOLUME - 2/ PRICE BID	Item no.2503 & A(d) of Package 2	The item no.2503 & A(d) are repeated in the BOQ under piling of (Package -2 Civil works) but with different quantities (750 nos.and 740 nos.)	This appears to be repetitive and please confirm which quantity is to be considered for in the bid.	Bidder to refer revised BOQ
73	VOLUME - 2/ PRICE BID	Item no.2603 of Package 2, Civil works.	Description of this item, refers ST no.1 and A11 for carraige of unserviceable material for disposal beyond intial lead of 1 km.	It is presumed that the reference should have been mentioned as item no.ST 2601 (earth work in stripping including disposal upto 1 Km). Please confirm.	Bidder to refer revised BOQ
74	Specific Technical Requirement	Cl. 3.02.03 d - for bored cast-in-situ piles, page 336, volume 1, book 1.	Minimum length of pile shall be 25m below cut off level and the cut off level shall be atleast 4m below ground level.	* As per item description for piles payment shall be made only from cut off level. Please confirm that the empty boring length measured from working ground level upto the pile cut off level shall not exceed 4m and in case the actual empty boring length is more than 4m in any individual pile payment shall be made for additional empty boring length beyond 4m measured as above.	Not agreed
75				* Please confirm that this similar provision shall be applicable for driven cast-in-situ piles also.	Not agreed
76				* Please include an appropriate item for empty boring beyond 4m length for both bored cast-in-situ piles and driven cast-in-situ piles in the BOQ.	Not required as the empty boring is included in the BOQ item.
77	Specific Technical Requirement	Cl. 3.02.03 (l) page 337	Dynamic cone penetration test shall be carried out for a depth of atleast 2m below pile termination depth and the frequency of DCPT shall be one test for each pile group (with 4 piles or more)	This is not practically possible and this will result in delays in the execution of the work. Further, since these tests are required to be carried out under item no.3014, Package 1, Ground Improvement Work, we request that this clause may please be deleted.	Not accepted. Work shall be done as per specification.
78	Specific Technical Requirement	Cl. 3.02.03(i), Page 336,	The safe lateral load carrying capacity of bored cast-in-situ piles indicated as 6.7t, 8.4t and 10t for 600mm, 750mm and 900mm dia. piles respectively.	* Please confirm that these indicated safe lateral capacities are under fixed head condition.	Lateral capacities are fixed head conditions.
79			Actual length of the pile shall not be less than design length	The length of pile may vary from location to location depending upon the actual sub soil conditions.	NDCT specification prevails
80	VOLUME - 2/ PRICE BID	Item no.2503A, Package 2, Civil works.	550mm dia. driven cast-in-situ piles, 20m long below cut off level.	Please indicate the proposed axial, lateral and uplift capacities of the proposed 20m long 550mm dia. driven cast-in-situ piles.	The approximate safe load carring capacities for 550mm diameter of driven pile is as follows. a) safe load carrying capacity in vertical compression = 120MT(max) b) safe load carrying capacity in uplift = 50MT(max) c) safe load carrying capacity in Lateral = 8MT(max) However actual safe load carring capacities for 550mm diameters of driven pile shall be furnished during detailed Engineering
81			Initial load tests are required to be conducted	Please confirm whether the contractor shall be permitted to instal working piles (both bored cast-in-situ and driven cast-in-situ piles) without waiting for any initial pile load test results subject however, to the contractor's guarantee for the indicated safe pile capacities.	Not permitted.
82	VOLUME - 2/ PRICE BID	Item no.2602 / Package 2, Civil works	Earth work in filling for site grading with borrowed outside murrum.	* It is presumed that the piling/ ground improvement works (for compaction piles, stone columns etc.) shall be commenced only after completion of site grading/ filling works envisaged in this item. Please confirm.	Tender Prevails

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
83				* Please indicate approximately the height of filling required to be done from the existing ground level.	Around 300mm filling envisaged.
84	VOLUME - 2/ PRICE BID & Specific Technical Requirement,	Item no. 3002, A3002, B3002, 3004, A3004 / Package 1, Ground improvement works & Cl. 3.02.05a to Page 338, vol 1, Book 1.	Compaction piles of 14m long 550mm dia., 15m long 550mm dia. and 15m long 500mm dia. & Stone columns 14m long 550mm dia. and 15m long 600mm dia.	* Please confirm that the indicated basic lengths are applicable for lengths measured from working ground level upto the bottom tip of the pile.	The length to be measured from ground level
85				* Please indicate the structures under which the compaction piles/ stone columns are proposed.	Bidder to quote in line with BOQ. Drawings can be furnished only during execution.
86				* Please indicate the bearing capacity requirement upto which the existing ground level is to be improved in each category/ case. Whether design responsibility for compaction piles/ stone columns will be with BHEL.	Design is in BHEL scope except for Cooling Tower.
87		Clause 3.02.05b to Specific Pile shoe. Page 339, volume 1, Book 1.	Detachable MS shoe flat/ conical at the bottom	* The description under these item nos. refers to a detachable MS shoe (flat/ conical at the bottom) to be used for installation of compaction piles. Please confirm that the Bidder can use or adopt an openable/ reusable MS shoe/ valve instead of a detachable/ disposable shoe.	Not accepted. Work shall be done as per specification.
88	VOLUME - 2/ PRICE BID	Item no.3004 & A 3004	Stone column with vibro displacement dry method.	It is observed that the sub soil water table is around 1.2m to 1.5m below existing ground level and the proposed dry method may not be possible/ feasible. Accordingly, please inform whether installation of stone column by driving technique (similar to the method of installation of compaction piles) can be adopted in lieu of the proposed vibro displacement method.	Bidder to quote as per BOQ
89			Geotechnical/ soil investigation report	Please furnish the complete copy of soil investigation report together with laboratory test results thereof together with the bore hole location plan, indicating thereon the bore hole numbers vis-à-vis the location of the proposed structures.	Detailed geotechnical investigation work is under progress. However Preliminary report is available at PSSR-Chennai office for reference.
90	Specific Technical Requirement	Cl. 3.02.03 A, page 335	3 stage flushing of the pile bore shall be ensured.	Please explain 3 stage flushing of the pile bore.	Flushing of pile bore shall be done as per IS-2911 part-1,section 2 to ensure proper cleaning.
91	Specific Technical Requirement	Cl. 3.02.03, Page 338, Vol 1, book 1. Pile load test.	Initial pile load test shall be conducted upto a maximum test load of 3 times upto the estimated safe load carrying capacity of the pile.	* As per clause 5.1.2 of IS 2911(Part 4):2013 initial test for piles shall be conduted upto 2.5 times the estimated safe load carrying capacity. Please confirm	Bidder to quote in line with techncial specification
92			Number of routine pile load test to be performed for each diameter in vertical compression and lateral load shall be atleast 1.5% of the total number of job pile in each case.	* As per Clause 5.2 of IS 2911 (Part 4):2013 the number of routine pile load test to be performed for each diameter shall be 0.5% of the total number of job piles in each case instead of 1.5%. Accordingly, the number of routine load test indicated in the BOQ under piling may please be suitably reduced and the revised BOQ may please be furnished.	Bidder to quote in line with techncial specification
93	Specific Technical Requirement	Cl. 3.02.04, Page 338, Vol. 1, Book 1, Pile integrity test.	Pile integrity test to be conducted on all job / test piles.	Since this proposal may have an impact on the overall completion schedule it is requested that the integrity test be restricted to around 10 to15% of the total number of job/ test piles.	Pile integrity test is a must
94	Ground Improvement works.	Item no.3016d of BOQ Package 1,	Triaxial shear test - no quantity for triaxial shear test.	Please furnish the number of triaxial shear test, if any, to be conducted, in the BOQ.	Not required
95	General	General	Bored acst-in-situ piles as per your bid	Considering our extensive exposure in the field of piling in all types of soil, we are of the opinion that Precast Segmetal piling technique will be technically far superior in quality and speedier for execution. It is also likely to be substantially cheaper compared to bored cast-in-situ piles. We may therefore be permitted to quote for Precast Segmental piling technique as an alternative to bored cast-in-situ piles for your consideration.	Tender prevails

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
96	TCC/VOL-IA	Cl. 1.3.7.5	Ordinary Portland Cement (OPC) shall be used for all structures except for foundations, underground structures & structures coming in contact with sea water where in Ordinary Portland cement with C3A content limited to 5% to 8% shall be used.	We request you to kindly quantify the volume of concrete where the contractor has to use OPC43 and OPC43 with C3A content limited to 5% to 8%.	Cannot be quantified presently. Bidder to quote accordingly
97	VOLUME - 2/ PRICE BID	SOQ Item No. 208	Providing and laying Design Mix cement concrete ..... control of concrete. Payment terms - a) After casting 75% ; b) After receipt of ultrasonic test report - 25%.	Please provide detailed specification for conducting UPV testing.	As per IS specification
98	VOLUME - 2/ PRICE BID	SOQ Item No. 210	Extra over ST Nos. 205 to 207 for conducting UPV test for concrete ….. as per specification.	Please provide the detail of structure/s where the contractor has to conduct UPV testing.	As per tender specification and TCC
99	VOLUME - 2/ PRICE BID	SOQ Item No. 909	Providing and fixing anodised aluminium work .....Weight of aluminium section only shall be measure.	For payment purpose, we understand that fittings and fixtures will be measured and paid separately under relevant item; as there is a separate item of door closure (SOQ Item no. 911). Please confirm.	All fittings and fixtures are included in this item and shall not be paid seperately
100	VOLUME - 2/ PRICE BID	SOQ Item No. 920	Roof skylight structure for atrium with 6mm thick Polycarbonate sheet….as per detailed drawing and specification.	We request you to pay polycarbonate sheet under this item and skylight structure will be measured and paid separately under relevant item.	Bidder to quote as per BOQ
101	VOLUME - 2/ PRICE BID	SOQ Item No. 1001	Providing brick work in cement mortar 1:5 (1 part cement 5 parts coarse sand) …..excluding plastering and painting.	Please confirm whether we have to use OPC43 or OPC43 with C3A content limited to 5% to 8%.	Cement will be in line with clause 1.3.7.5 of TCC
102	VOLUME - 2/ PRICE BID	SOQ Item No. A1417	Providing and laying heavy duty anti skid ceramic tiles……	We presume that under cement mortar will be measured and paid separately under relevant item. Please confirm.	Underbed included in the item.
103	VOLUME - 2/ PRICE BID	SOQ Item No. 1500	ROOFING / SIDE CLADDING	We request you to consider stud bolts for fixing of sheets which should be paid separately on 'Per Number' basis.	Bidder to quote as per BOQ
104	VOLUME - 2/ PRICE BID	SOQ Item No. A1508	Providing and installing fire resistant under deck insulation . . . including clips.	Please confirm the density of insulation material.	Density provided in specification
105	VOLUME - 2/ PRICE BID	SOQ Item No. 1813	Providing Earthing pit as per drawing ... all complete.	Please provide detailed specification and relevant drawing / sketch	Shall be provided during detail engg stage
106	VOLUME - 2/ PRICE BID	SOQ Item No. 1814	Construction of below ground earthing system test pits as per drawing/ sketches ….including associated earthwork.	Please provide detailed specification and relevant drawing / sketch	Shall be provided during detail engg stage
107	VOLUME - 2/ PRICE BID	SOQ Item No. 2208	Providing, laying light duty non pressure NP3 class RCC pipes ... etc all complete.	We understand that earthwork in excavation and backfilling, concrete works, sand bedding etc. will be measured and paid separately under relevant item/s.	Item includes providing and laying of the RCC pipe. Excavation, backfilling, sand bedding shall be paid seperately under relevant item
108	VOLUME - 2/ PRICE BID	SOQ Item No. 2209	Providing, laying light duty non pressure NP2 class RCC pipes ... etc all complete.	We understand that earthwork in excavation and backfilling, concrete works, sand bedding etc. will be measured and paid separately under relevant item/s.	Item includes providing and laying of the RCC pipe. Excavation, backfilling, sand bedding shall be paid seperately under relevant item
109	VOLUME - 2/ PRICE BID	SOQ Item No. 2210	Providing, laying light duty non pressure NP4 class RCC pipes ... etc all complete.	We understand that earthwork in excavation and backfilling, concrete works, sand bedding etc. will be measured and paid separately under relevant item/s.	Item includes providing and laying of the RCC pipe. Excavation, backfilling, sand bedding shall be paid seperately under relevant item
110	VOLUME - 2/ PRICE BID	SOQ Item No. 2419	Providing and laying cement concrete of grade M30 ... etc. all complete.	Please confirm whether we have to use OPC43 or OPC43 with C3A content (limited to 5% to 8%) for this item.	OPC grade 43 shall be used
111	Volume-VI(A)		Ash Handling System	We understand that Ash Handling System is not included in the scope of this tender. Please confirm.	Scope of the bidder as given in the clause 1.2 of TCC
112	VOLUME - 2/ PRICE BID	SOQ Item No. A2414	Supply and laying 150mm dia R.C.C NP-3 . . . etc all complete.	We understand that earthwork in excavation and backfilling, concrete works, sand bedding etc. will be measured and paid separately under relevant item/s.	Item includes providing and laying of the RCC pipe. Excavation, backfilling, sand bedding shall be paid seperately under relevant item
113	VOLUME - 2/ PRICE BID	SOQ Item No. 2418, A2418 & 2419	Concrete Road works	Please provide the detailed drawings for execution of this item.	Drawings are not available

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
114	VOLUME - 2/ PRICE BID	SOQ Item No. A2305	Providing and applying two coats of high built epoxy based colour Finish paint . . . all complete.	Please provide detailed specification against this items.	As per specification and relevant IS code
115	General		Access Roads	We presume that all weather access road within plant premises and intake area will be constructed and maintained by BHEL. Please confirm.	Refer clause 6.1.7 of GCC
116	Section C1; Vol IIB	6.08.00	RCC staircase for approach to Hot water …. & aviation warning lamp etc.	RCC staircases will give approach upto Hot water distribution level platform. Further access will be provided by cage ladder.	The Clause is refered for Aviation warning Lights (if any as per technical Specification) at Hot Water Distribution Level. Further details shall be discussed during Details Engineering.
117	Section C1; Vol IIB	6.14.00	Buried pipe in bidder's scope shall be RCC duct.	Our understanding is that the buried pipe is in bidders scope will MS pipe with RCC encasement. Please confirm.	Buried Pipe shall be as per S.No.6 of Datasheet-A, Section-D1, Vol IIB.
118	Section C1; Vol IIB	8.01.00	The balance three (3) cooling towers …..tested by bidder	As per Datasheet-A, total number of cooling towers is two. The mentioned clause is in contradiction with the above.	Please read the Clause as " The balance one (1) cooling tower shall be tested by bidder himself in presence of Employer/Purchaser.
119	Section C1; Vol IIB	8.03.05	RH curves for 5%, 20%, 40% …..	Below 40%, possibility of inversion is higher, and hence performance is not predictable. Hence pl. accept 40% & above.	Bidder to comply Technical Specification.
120	Section C1; Pg 376	--	Performance Guarantee	The performance guarantee parameters like cooling range and design ambient wet bulb temperature are not matching with the design parameters stipulated in the Data Sheet - A	Performance Gaurantee Parameters are for the Guaranteed Performance Curves to be furnished & complied by the Bidder. Bidder to comply the Technical Specification.
121	Standard Electrical Scope between BHEL & Vendor; Vol IIB	Note 1	Make of electrical equipment ……subject to approval of BHEL / Customer	Please furnish the approved vendor list for electrical and other items as well.	List of approved vendor is attached. Vendors against which submit credentials is written shall be taken for approval later.
122	Data Sheet - A	2.8	Design relative humidity	For proper designing of a natural draught cooling tower, design relative humidity figure is a must and this can not be left to bidder. Please specify the same.	Bidders to consider Design Relative Humidity as 60%.
123	Section C3; Vol IIB	3.01.02	Geo-technical investigation report	Please furnish detailed geo-technical investigation report.	Detailed geotechnical investigation work is under progress.However Preliminary report is avaialble at PSSR-Chennai office for reference.
124				Please clarify whether Piling Works for Cooling Tower should be considered in the Lump sum cost of Cooling Tower or the same has already been included in the Piling work under Civil Package.	Piling works for cooling tower should be considered in the lumpsump cost.
125				Please provide values for Wind Basic Velocity, K1, K2, K3.	As per specification and relevant IS code
126				Please confirm the distance of plant from sea shore.	Bidder to visit site

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
127	Section C1; Vol IIB	6.08.00	RCC staircase for approach to Hot water …. & aviation warning lamp etc.	RCC staircases will give approach upto How water distribution level platform. Further access will be provided by cage ladder.	The Clause is refered for Aviation warning Lights (if any as per technical Specification) at Hot Water Distribution Level. Further details shall be discussed during Details Engineering.
128	Section C1; Vol IIB	6.14.00	Buried pipe in bidder's scope shall be RCC duct.	Our understanding is that the buried pipe is in bidders scope will MS pipe with RCC encasement. Please confirm.	Buried Pipe shall be as per S.No.6 of Datasheet-A, Section-D1, Vol IIB.
129	Section C1; Vol IIB	8.01.00	The balance three (3) cooling towers …..tested by bidder	As per Datasheet-A, total number of cooling towers is two. The mentioned clause. is in contradiction with the above.	Please read the Clause as " The balance one (1) cooling tower…tested by bidder.
130	Section C1; Vol IIB	8.03.05	RH curves for 5%, 20%, 40% …..	Below 40%, possibility of inversion is higher, and hence performance is not predictable. Hence pl. accept 40% & above.	Bidder to comply Technical Specification.
131	Section C1; Pg 376	--	Performance Guarantee	The performance guarantee parameters like cooling range and design ambient wet bulb temperature are not matching with the design parameters stipulated in the Data Sheet - A	Performance Gaurantee Parameters are for the Guaranteed Performance Curves to be furnished & complied by the Bidder. Bidder to comply the Technical Specification.
132	Standard Electrical Scope between BHEL & Vendor; Vol IIB	Note 1	Make of electrical equipment ……subject to approval of BHEL / Customer	Please furnish the approved vendor list for electrical and other items as well.	List of approved vendor and letter from customer is attached in the mail. Vendors against which submit credentials is written shall be taken for approval later.PSSR to take necessary action accordingly.
133	Data Sheet - A	2.8	Design relative humidity	For proper designing of a natural draught cooling tower, design relative humidity figure is a must and this can not be left to bidder. Please specify the same.	Bidders to consider Design Relative Humidity as 60%.
134	Section C3; Vol IIB	3.01.02	Geo-technical investigation report	Please furnish detailed geo-technical investigation report.	Detailed geotechnical investigation work is under progress.However Preliminary report is avaialble at PSSR-Chennai office for reference.
135	Volume-VI(A): Civil, Structural & Architectural Works, Cl. 2.01.00, pg. 535 of 1014	This specification is to cover design, preparation of general arrangement, construction as well as fabrication drawings, supply of all labour as well as materials and construction of all civil, structural as well as architectural work on EPC basis.		Please confirm that the design and preparation of general arrangement drawing and construction and fabrication drawings are not in the scope of the bidder. Our understanding is that the work is not as per EPC basis but only item rate contract except for NDCT	Refer reply under Sl. No 6. NDCT is on EPC basis
136	Volume-VI(A): Civil, Structural & Architectural Works, Scope of Civil and Structural work, Cl. 2.02.00, Pg 535 of 1014	The work to be performed under this specification consist of design, engineering as well as providing all labour, materials, consumables, equipment, temporary works, temporary labour, constructional plant, fuel supply, transportation and all incidental items not shown or specified but reasonably implied or necessary for the completion and proper functioning of the plant, all in strict accordance with the specifications and including revisions and amendments thereto as may be required during the execution of the work.		Please clarify the term 'design , engineering and 'fuel supply' is not in the scope of the bidder	Scope of the bidder as given in the clause 1.2 of TCC
137	Volume-VI(A): Civil, Structural & Architectural Works, Scope of Civil and Structural work, Cl. 2.05.00, Pg 535 of 1014	The work shall be carried out according to the design/drawings to be developed by the Contractor and approved by the Purchaser. For all building and structures, foundations, etc. necessary layout and details are to be developed by the Contractor keeping in view the statutory & functional requirements of the plant & facilities and providing enough space …..		Bidders understanding is that drawings for construction shall be issued by BHEL to the contractor as per the work schedule.	Yes.

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
138	Volume-VI(A): Civil, Structural & Architectural Works, Scope of Civil and Structural work, Cl. 2.06.00, Pg 540 of 1041		(a) Site surveying. (b) Soil investigation and preparation of soil investigation report and suggestion of type of foundations including design of piles. ……. evaluation of sub surface properties up to 15.0 m below the existing Ground level. (d) Preparation of Architectural drawings. (e) Design, preparation of drawings and construction of all structures.	Bidder does not envisage the scope as stated in the clause. Please confirm.	Scope of the bidder as given in the clause 1.2 of TCC
139	Volume-VI(A): Civil, Structural & Architectural Works Cl. 14.01.00, Pg 635 of 1014,		External Coal Handling System From Coal Berth -3 to Plant Area:	Please confirm coal handling and external coal handling works are not in the scope of the bidder	Scope of the bidder as given in the clause 1.2 of TCC
140	Volume-VI(A): Civil, Structural & Architectural Works, Cl.18.10.00, pg 662 or 1014		Landscaping	Please confirm that landscaping is not in the scope of the bidder	Scope of the bidder as given in the clause 1.2 of TCC
141	A1002 a / 1003 a, Price schedule , pg 28 of 76		Using fly ash lime bricks confirming to IS 12894 with crushing strength of 75 kg/cm2	Please confirm if fly ash shall be provided free of cost by BHEL/customer to the bidder for making of fly ash bricks.	As such bidder to quote in line with the BOQ specification. However if fly ash is provided free of cost, necessary rebate to be passed on to BHEL/TANGEDCO
142	V-2 Price Bid, Item 404 , Pg 16 of 76		Extra over ST No. 401, 402 & 403 for providing fusion bonded epoxy coating by mechanized & qualified process including blast cleaning to white metal as per Swedish code, heating in induction heater, electrostatically spraying the epoxy powder, complete fusion to give….	Please confirm if 7000 MT of reinforcement steel is to be provided to the bidder by BHEL. Also, please specify the shifting distance from the store to the place for epoxy coating.	Refer Clause 1.3.6 of TCC
143	V-2. Price Bid		General	We do not find the item for fixing of reinforcements. Please clarify	BOQ to be followed.
144	V-2 Price Bid, Item A112 , Pg 11 of 76		Earthwork in excavation using Horizontal directional drilling (HDD) technique including equipments, machinery etc. all complete.	Please provide the horizontal drilling length , diameter and details and drawings for clarity.	Presently drawings are not available. Bidder to follow item specification.
145	V-2. Price Bid			We do not find any line item for sheet piling. Please confirm if the same will be paid separately.	If required, the same will be paid as an additional item.
146	V-2 Price Bid, Item A211 , Pg 14 of 76		Providing and encasing of structural steel member with concrete using nominal aggregate size of 12.5mm down. Encased member shall be wrapped with welded wire mesh/chicken wire mesh with proper lap etc. complete as per specification for the following grades.	Please clarify if welded mesh or chicken mesh to be used for column encasing.	Bidder to refer revised BOQ

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
147	V-2 Price Bid, Item 102 , Pg 10 of 76	Extra over ST No. 101 for dewatering of ground water by well point method as per IS 9759.		Please provide method of measurement for the same. Also please provide drawings for deep excavation for clarity.	Bidder to quote as per BOQ
148	VOLUME : II B, Sheet 6 of 9, Cl.7.6.1, Pg 417 / 1041, Volume 1A TCC	In case the cold water temperature exceeds the acceptable limits of purchaser, the whole plant will be rejected and the vendor shall refund the entire money paid to him together with any penalty levied otherwise.		Please state the acceptable limit for the cold water temperature/ Limit of the penalty	Please refer Cl. No. 11.00.00, Page 9 of 11, Section C1, Vol IIB.
149		General		Please confirm that no work beyond the boundary as shown in the plot plan is in the scope of the bidder.Bidders scope of work is limited to the works within the boundary line of the plot plan. Please confirm.	Extension of channel from stage 2 of NCTPS loacted at a distance of approx. 8 km from site is included in scope
150		General		Please provide existing contour level drawings and the finished ground level of the plant .	Existing ground Level is 9.2 m. Finished ground level will be RL 9.5 m
151		General		Please confirm if MOEF clearance has been accorded for the project. We find that the accorded MOEF is for 2 Units of 800 MW. Please clarify.	Customer would have taken clearance
152		General		Please confirm if Deemed export benefits is available for the project	No
153		General		Please confirm that civil works related to Coal handling, ash handling and Switch yard package are not in the scope of the bidder.	Scope of the bidder as given in the clause 1.2 of TCC
154	Volume IIB, Clause 11.01.04	Fabrication Yard		We presume that levelled, graded land for Fabrication yard within the plant premises shall be provided. Please confirm. Kindly provide the sizes for covered fabrication shed along with H.O.T/ E.O.T capacity.	Only levelled land wil be provided by BHEL
155		Structural fabrication		Kindly confirm whether 100% structural fabrication work can be carried out at outside fabrication shop or within site premises.	Fabrication envisaged only within the plant boundary.
156		General		Please confirm whether the project avails Deemed export benefit.	No
157		Labour Colony		Since, conveyance of huge workforce is big concern, please confirm that whether land for Labour colony shall be provided within the plant premises at free of cost.	Tender prevails
158	NDCT, Clause 3.02.00	Foundation System		We presume that the ground improvement with compaction piles in NDCT area is not in NDCT package scope. Only RCC piling is considered in NDCT package scope. Kindly confirm	NDCT on EPC basis inlcuding piling and ground improvement works
159	Data Sheet- A	Relative Humidity		Relative Humidity to be considered is not mentioned in the specifications. As Relative Humidity is a sensitive parameter for NDCT design, we request you specify the Relative Humidity to be considered for NDCT Design to be followed by all bidders uniformly. However we propose to consider design Relative Humidity as 60 % based on our experience. Kindly confirm.	Bidders to consider Design Relative Humidity as 60%.
160	Vol-IA Part – I, Chapter-VIII, Taxes & Duties, Cl.1.8.2.3	The bidder shall obtain prior consent of BHEL before billing the service tax amount and shall adopt the service tax billing methodology suggested by BHEL.		The bidder may be permited to choose his own methodology for service tax billing. Kindly confirm.	Methodology as per Valuation Rule 2(A) of Service Tax Rules is only to be adopted.
161	Vol-IA Part – I, Chapter-VIII, Taxes & Duties, Cl.1.8.2.4	BHEL will reimburse the Service Tax based on last / Current Month Tax paid GAR-7 Chelan only……		The return filed by us, is on consolidated basis, considering all divisions. However we shall submit service tax paid Challan or certificate for adjusting the service tax amount against cenvat credit, whichever is applicable for particular transition to reimburse the service tax amount as claimed in the invoice. Please confirm.	Acceptable as per cl 1.8.2.4. Copy of Half-yearly Returns to be given proving Service Tax claims.
162	Vol-IA Part – I, Chapter-VIII, Taxes & Duties, Cl.1.8.1.3	Deduction of VAT (WCT) at source would be enforced from the running bills at the rates prescribed unless exemption certificate		This being civil job, WCT shall be deducted at 2% only. Please confirm.	WCT TDS as per rates in force shall be deducted.

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
163	Vol-IA Part – I, Chapter-VIII, Taxes & Duties, Cl.1.8.1.4	The copy of monthly/quarterly VAT return along with Annexure 2 of the Return containing invoice wise Return filed, duly…….		The return filed by us, is on consolidated basis, considering all divisions. However we shall submit service tax paid Challan or certificate for adjusting the service tax amount against cenvat credit, whichever is applicable for particular transition to reimburse the service tax amount as claimed in the invoice. Please confirm.	Clause is regarding VAT. Query is not relevant. Clause stands.
164	Vol-IA Part – I, Chapter-VIII, Taxes & Duties, Cl.1.8.1.5	On Completion of Assessments, a copy of the Assessment Order is required to be submitted to BHEL.		It is difficult to comply the conditions stated in the said clauses. Kindly consider deleting this clause	The clause is conditional ie. On completion of Assessments. Clause Stands.
165	Vol-IA Part – I, Chapter-VIII, Taxes & Duties, Cl.1.8.4.1	Any other taxes and duties (except VAT & Service Tax) if any, as applicable, viz. Entry Tax, Octroi, Licenses, Deposits, Royalty, Stamp Duty……		Other Taxes & Duties : Any variation in Entry tax, Octroi and other taxes during the tenure of the contract are also to be borne by BHEL. Kindly confirm.	Clause stands. Variations to Bidder's account only.
166	Vol-IA Part – I, Chapter-VIII, Taxes & Duties, Cl.1.8.6.1	…….. The bidder shall give the benefit of downward revision in favour of BHEL. No other variations shall be allowed during the tenure of the contract.		The bidder shall give the benefit of downward revision in favour of BHEL. No other variations shall be allowed during the tenure of the contract". We suggest the deletion of last sentence in this clause… The sentence is contradictory impact on upward revision /downward revision are to be suitably paid /adjusted from the date of respective variation.	The emphasis is laying on benefit of downward revision passed on to BHEL is not contradictory as the Price is VAT inclusive.
167	Vol-IA Part – I, Chapter-VIII, Taxes & Duties, Cl.1.8.5	In case government imposes any new levy / tax……..		In the event of introduction of GST or any other tax in lieu of ED /Service Tax / Vat/Sales tax the impact of differential tax liability if any on the total contract price including Bought out items (to be dispatched directly from sub vendors works to site) will also be adjusted in contract price subject to documentary evidence.	The impact of GST is covered as "Statutory variation" only , covering only direct transaction between BHEL and the Bidder and does not cover "bought outs".
168		General		Please confirm Mega Power Status is available for this project. Please provide relevant copies if applicable.	No communication from customer
169				Please confirm if any Specific SEZ Tax (VAT) exemption notification issued by Govt. for this particular project owing to SEZ. If is please provide with details.	This project does not come under SEZ.
170	NIT, Cl.6.0, ii	BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding. (i) In case of acceptance of the deviations, appropriate loading shall be done by BHEL (ii) In case of unacceptable deviations, BHEL reserves the right to reject the tender.		1) Kindly clarify the loading criteria in case deviations are accepted by BHEL. 2) Modify Pt. (ii) as under : In case of unacceptable deviations, BHEL reserves the right to reject the deviations and bidder need to comply the same.	Tender prevails
171	NIT, Cl. 29	In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below: a. Amendments / Clarifications / Corrigenda / Errata etc. issued in respect of the tender documents by BHEL b. Notice Inviting Tender (NIT) c. Price Bid d. Technical Conditions of Contract (TCC)—Volume-1A e. Special Conditions of Contract (SCC) —Volume-1B f. General Conditions of Contract (GCC) —Volume-1C g. Forms and Procedures —Volume-1D		We propose the following changes as under in the Order of precedence. In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below: a. Post tender correspondence including minutes of meetings with the Contractor and record notes of tender negotiations. b. Amendments / Clarifications / Corrigenda / Errata etc. of later date issued in respect of the tender documents by BHEL c. Notice Inviting Tender (NIT) d. Price Bid e. Technical Conditions of Contract (TCC)—Volume-1A f. Special Conditions of Contract (SCC) —Volume-1B g. General Conditions of Contract (GCC) —Volume-1C h. Forms and Procedures —Volume-1D	Tender prevails
172	Volume 1A Part-1 Chapter- III,Cl. 1.3.5.2	In case of non-availability of water, the contractor shall make his own arrangements for uninterrupted work		Modify as: In case of non-availability of water, the contractor shall make his own arrangements through borehole for uninterrupted work whose necessary permit and clearance shall be made available by BHEL	Water from the borehole should be fit for construction, any clerance required from the statutary authorities is in the bidder scope.
173	VOLUME-IA PART – I CHAPTER-VI, Cl. 1.6.1	Insert New Clause ;		Request to insert the New clause as under : In case of delay in time schedule due to any act or omission by BHEL, suitable time-extension along with cost compensation shall be provided by BHEL.	Tender prevails

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
174	VOLUME-IA PART – I CHAPTER-VI, Cl. 1.6.6VOLUME-IA PART – I CHAPTER-VI, Cl. 1.6.6		Guarantee period of 12 months shall commence from the date of completion of the whole of the work certified by the Engineer.	Request to insert the new sub clause as under : Sunset period for defect liability period (DLP) shall be 24 months from the start of DLP for respective units.	Tender prevails
175	VOLUME-IA PART – II CHAPTER –I, Cl. 3.2.9.3		The total amount of PVC shall not exceed 20% of the cumulatively executed contract value.	We request you to modify as under : a) PVC capping for Cement and Steel should be 20 % for the entire original contract period. b) There should be no PVC capping for the extended period for Cement, Steel, Labour, High Speed Diesel oil and Materials (Other than Cement & Steel).	Tender prevails
176	GCC, Cl. 1.11, Page 10 of 32		Security Deposit shall be refunded/Bank Guarantee(s) released to the Contractor along with the “Final Bill” after deducting all expenses / other amounts due to BHEL under the contract / other contracts entered into with them by BHEL.	We request you to modify as under : Security Deposit shall be refunded/Bank Guarantee(s) released to the Contractor along with the “Final Bill” after deducting all expenses / other amounts due to BHEL under This contract entered into with them by BHEL.	Tender Prevails
177	New Clause		Insert new clause :	Unforeseen Condition : If, during the execution of the Contract, the Contractor encounters on the site any physical conditions (other than climatic conditions) or artificial obstructions that could not have been reasonably foreseen prior to the date of the Contract Agreement by an experienced contractor on the basis of reasonable examination of the data and information relating to the Facilities (including any data as to boring tests) provided by the the Owner, and on the basis of information that it could have obtained from visual inspection of the Site(if access thereto was available) or other data readily available to it relating to Facilities, and if the Contractor determines that it will in consequence of such conditions or obstructions incur additional cost and expense or require additional time to perform its obligations under the Contract that would not have been required if such physical conditions or artificial obstructions had not been encountered, the Contractor shall promptly, and before performing additional work or using additional Plant and Equipment or Contractor‘s Equipment, notify the Project Manager in writing of The physical conditions or artificial obstructions on the Site that could not have reasonably foreseen The additional work and/or Plant and Equipment and/or Contractor’s Equipments required, including the steps which the Contractor will or proposes to take to overcome such conditions or obstructions The extent of the anticipated delay The additional cost and expense that the Contractor is likely to incur.)On receiving any notice from the Contractor under this Clause, the Project Manager shall promptly consult with the Owner and the Contractor and decide upon the actions to be taken to overcome the physical conditions or artificial obstructions encountered. Following such consultations, the Project Manager shall instruct the Contractor, with a copy to the Owner, of the actions to be taken. Any reasonable additional cost and expense incurred by the Contractor in following the instructions from the Project Manager to overcome such physical conditions or artificial obstructions referred to in this Clause shall be paid by the Owner to the Contractor as an addition to the Contract Price. If the Contractor is delayed or impeded in the performance of the Contract because of any physical conditions or artificial obstructions referred to in this Clause, the Time for Completion shall be extended.	Tender prevails
178	GCC, CL. 2.7.1, Page 18 of 32		To withdraw any portion of work and / or to restrict / alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to suit BHEL”s commitment to its customer or in case BHEL decides to advance the date of completion due to other emergent reasons / BHEL”s obligation to its customer.	In such cases, if Contractor suffers economic loss then he should be adequately safeguarded through reasonable cost compensation.	Tender prevails

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
179	VOLUME-IA PART – I CHAPTER-VII, CL. 1.7.5	Final Bill & Retention Amount-5%		As per Vol-1 A, Part-II Chapter-1, Sl.No.2, Retention Amount (GCC Cl.No.2.22) is not applicable to this contract. Hence, we understand that "Interim payments for other than Cooling tower works" and "Interim Payment for each Cooling tower" (TCC, Vol-1A, Part-1, Chapter-VII Cl No. 1.7.3 & 1.7.4) on pro-rata basis shall be 95% and 85% respectively. Kindly confirm.	Tender prevails
180		Construction Schedule		Please provide L1 Schedule	Project schedule given in the tender
181		General		We shall be permitted to use crushed sand for construction work. Kindly confirm.	In line with the clarification given for TCC
182	Technical specification for Vibro displacement method, Cl.3.01.00	Stone aggregate for stone column works		Generally stone aggregate size of 40mm down aggregate is very much suitable for vibro displacement method (dry method) as mentioned in BoQ item 3004. However, 50mm down aggregate is mentioned in technical specification which is not suitable for this method. Request you change the same to 40mm and accordingly grading of aggregate shall be considered.	Refer reply for Sl No 19
183	Technical specification for Vibro displacement method, 6.02.01	Routine Plate Load Test		Generally, post ground improvement plate load test will be carried out as per IS 15284 Part 1. But Technical specification conforming IS 1888. Request you to consider IS 15284 and confirm the same.	Refer reply for Sl No 20
184	Drawings	Drawings for Ground Improvement works		Please provide stone column layout plan and cross section drawings where ground improvement works need to be done.	Refer reply for Sl No 21
185	NIT- Qualification Criteria, B-1, Cl.10.0	The Consortium partner shall submit additional EMD to BHEL……		The consortium partner shall submit the additional EMD of Rs. 2 Crore to BHEL for ground improvement works. If single ground improvement contractor associated with multiple prime bidders, Can GI contractor submit EMD only once to BHEL? Or need to submit different EMDs with all main bidders associated with?. Please confirm.	Tender prevails
186	SCT1575_VOLUME-2 _PRICE BID, Item No. 109 , Pg 11 of 76.	Extra over ST No. 101 and 103 to 107 for carriage of excavated earth/selected materials for every 1 km or part thereof beyond an initial lead of 500m.		Item 103 as mentioned in item 109 is not available . Please provide the Item 103 detail.	Bidder to quote as per revised BOQ
187	SCT1575_VOLUME-2 _PRICE BID, Item No. 213 , Pg 14 of 76.	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262-2009 for reinforced concrete works using graded aggregate for Concrete in precast works like roof slabs/trench covers, fins, lintels, chajas, beams, columns, wall panels, facias etc.at all levels in all kinds of work including formwork/moulds….		Please specify item against which reinforcement and edge angles will be paid?	will be paid under under 402 and edge angles required if any will be paid under relevant item in BOQ
188	SCT1575_VOLUME-2 _PRICE BID, Item No.303 , Pg 16 of 76,	Fairface Formwork with good quality water proof ply wood of required thickness and smooth surface for TG superstructure (above base raft level) including preparation of scheme, designing, submission and approval of staging drawing with sufficient props, braces and ties at every tier of height of approx. 4m for all heights…		Will ID , FD & PA Fans , BFP superstructure etc; also be payed under this item?	No.
189	SCT1575_VOLUME-2 _PRICE BID, Item No. 402 , Pg 16 of 76.	Providing, straightening, cutting, bending, placing in position at any level, binding in position of steel reinforcements of TMT steel of grade Fe-500 confirming to IS:1786 including cost of binding wire, labour, scaffolding, transportation to & from stores etc complete all as per specifications, drawings and as directed by Engineer.		Please clarify if straightening, cutting, bending, placing in position at any level, binding in position of steel reinforcements for Piling will also be payed against this item? We suggest paying this against a different item number.	Bidder to quote as per BOQ
190	SCT1575_VOLUME-2 _PRICE BID, Item No. 402 , Pg 55 of 76.	Installation of Bored cast-in-situ RCC vertical pile as per IS 2911 (Part 1 Sec 2) with diameter and length as specified (length to be measured from pile cut-off level to the bottom of pile) using cement concrete grade M25 onforming….		Please specify the approximate/average cut off level for pile.	Bidder to quote as per BOQ
191	SCT1575_VOLUME-2 _PRICE BID, Item No. 2503 , Pg 55 & 56 of 76.	Installation of Bored cast-in-situ RCC vertical pile as per IS 2911 (Part 1 Sec 2) with diameter and length as specified (length to be measured from pile cut-off level to the bottom of pile) using cement concrete grade…		Item 2503 -Ad appears twice, one for M25 grade and another for M30 grade. Please specify which shall be operatable.	Bidder to refer revised BOQ
192	SCT1575_VOLUME-2 _PRICE BID, Item No. 2504 , Pg 56 of 76.	Extra over ST. No. 2503 for pile length more than the specified length of 25m below cut off level for the following.		Is this item applicable only for pile with M30 grade concrete. Please clarify. Please provide similar item for Pile with M25 grade.	Bidder to refer revised BOQ
193	BOQ, DOORS, WINDOWS, VENTILATORS, LOUVERS	ST No A922	Providing and fixing of wooden panels for interior partition including fittings, fixtures etc all complete.	Please provide the thickness of wooden panels	Detail provided in specification

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
194	BOQ, ROAD WORKS	ST No 2425	Providing and filling in position hot applied bitumen sealing compund (Grade A) of specified thick confirming to IS 1834 including cleaning, mixing, heating, pouring/injecting sealing compound in gaps in joints, sealant primer etc all complete as per specification, drawing and as directed by Engineer.	Please provide the thickness of gaps in joints	detail to be provided during detail engg stage
195	BOQ - Package 3, Painting	ST No 53 & 54	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with synthetic enamel paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all labours, material and & equipment,surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification.	We presume that two coats of Painting work. Kindly confirm.	Item 54 shall have coats as per the specification. Item 53 (synthetic enamel) shall have two coats of paint over two coats of primer.
196	TCC - Vol. IA- Part - I , Chapter - 8 TAXES AND OTHER DUTIES	New Levies / Taxes	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with synthetic enamel paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all labours, material and & equipment,surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification.	In case Government imposes any new levy / tax after due date of Bid and work during the tenure of the contract. Please Confirm.	Tender prevails
197	TCC - Vol. IA- Part - II , Chapter - 1 PRICE VARIATION COMPENSATION FOR 3.1 & 3.2	PVC for CEMENT , STEEL, LABOUR, HIGH SPEED DIESEL OIL, and MATERIALS	COMPONENT ('K') for CIVIL PACKAGES	We presume that the PVC clause shall applicable to Package 1 to 4. Please Confirm.	Tender prevails
198	TCC - Vol. IA- Part - II , Chapter - 1 PRICE VARIATION COMPENSATION FOR 3.2	S.No.3.2.8	PVC shall not be applicable for the entire original contract period and applicable only for the extended contract period. However the Total Quantum of Price Variation amount payable/recoverable shall be regulated as follows:	We presume that PVC shall be applicable for the entire original contract period and the extended contract period. Please Confirm.	Tender prevails
199	General	ESI & Labour Cess		We presume that ESI & Labour Cess are not in Contractor Scope . Please Confirm.	Tender prevails
200	General	Labour Camp		Request you to provide the land for Labour Camp in side the site at free of cost.	Tender prevails
201	NIT - Pg No.24 Technical Qualification Criteria	Annexure-3, S.No B 1	1 Bidder should have executed the following in Power/Industrial projects 1.1 One (1) civil or civil and structural work of value not less than Rs 1030 crores (OR) 1.2 Two (2) civil or civil and structural works each of value not less than Rs 640 crores (OR) 1.3 Three (3) civil or civil and structural works each of value not less than Rs 510 crores	Request you to accept the Consortium Partner Qualification Criteria also in this Head . OR Alternatively Reduce the Qualification Criteria Value to 300 Cr. For Three (3) civil or civil and structural works each of value. In Ref. PQ criteria sr. No.1 it is requested to allow the Consortium Parties values of respective package like RCC Chimney, Structural Column, Cooling Tower, etc	Refer revised Pre qualification Criteria
202	NIT - Pg No.24 Technical Qualification Criteria	Annexure-3, S.No B 1(Note for 1.1 to 1.3:)	No separate loading will be considered against clause No 1 above for FREE SUPPLY items like Cement, Steel etc. from customer.	Request you to considered the Free supply material . In In Ref. PQ criteria sr. No.1 it is requested to include value of client supply materials also as major cost in power plant Project lies in this category	Refer revised Pre qualification Criteria
203	General	Date of Submission	10/2/2015 , Time :15.00 Hrs	We request you to extend the last date submission of our techno commercial bid on **10/03/2015**.	Corrigendum on time extension issued separately
204	NDCT		specification of splash fill	Specfivcation of fills to have a choice of fill selecton for PP or PVC	Not accepted, bidder to quote as per spec. Bidders query for different MOC of Fills cannot be accepted and to comply with the Technical Specification.

Sr. No.	Section No.	Reference in Tender Specification No.	Existing as per Clause	Clarification sought	BHEL Clarification
205	Vol-VI	TANGEDCO/DESEIN document	NDCT	As per the referred clause of the specification (TANGEDCO/DESEIN document) pressure relief valves can be considered to counter buoyancy upto 60% of the hydrostatic pressure. As the forebay is an extension of the cooling tower basin, we request you to accept similar concept for the pond floor and cold water channel from cooling tower.	Bidder to comply with specification requirement. No deviation accepted. No pressure relieve value shall be allowed in the cooling tower basing and channel.
206	Vol. 1A	1.6.7.1	Construction Schedule	This clause indicates the schedule for the two units. Under boiler light up both units are indicated as 24 months. In line with the other schedules in the same table, the U2 lightup should also be staggered from Unit-1 and shall be 27 months.	In line with the clarification given for TCC
207	Vol-IA	Vol-IA,Part-II, Chapter-II, Formats	Consortium Agreement	There are two consortium agreements provided in the tender document, one in Vol-IA,Part-II, Chapter-II,Formats & the other in Vol-I, Book-II, Forms & Procedures. Please clarify which agreement to be followed.	Refer the revised Consortium Agreement in TCC
208	Notes for 1.1 to 1.3, annexure 3 of NIT, qualification Criteria		No separate loading will be considered against clause No 1 above for FREE SUPPLY items like Cement, Steel etc. from customer.	Request to kindly consider the value of Client issued material in the value of works executed	Refer revised Pre qualification Criteria
209	Cl No. 2.13, GCC, Interest Bearing recoverable Advance		Applicable Rate of interest shall be the prime lending rate of State Bank of india prevailing at the time of disbursement of the advance +2%	Since the contract value is huge, request to kindly provide advance as intersst free	Tender prevails
210	Reverse Auction clause in TCC		BHEL may opt for reverse auction depending on situation as per company policy	since the contract value is huge, request not to consider RA for this contract	Tender prevails
211	Definition Clause, Annexure 3 of NIT, Qualification Criteria		Prime Bidder has ro qualify against Clause 1, 2.2, 2.3 & 2.4. Consortium partner has to qualify agaisnt clause 2.1, 2.5 & 2.6	Kindly allow the consortium to fulfill the PQ as a whole with limiting the members to 4 No's	Tender prevails. Refer revised Pre qualification Criteria
212	Sl No 3.2, TCC PVC on Labour, HSD and other material		Price VARIATION COMPENSATION (totalling to 40%) for LABOUR, HIGH SPEED DIESEL OIL, and MATERIALS during the extended period	Request to kindly provide Price Variation on Labour, HSD and other materials during the contract period.	Tender prevails
213	General				Bidders to seek any clarification if required on or before 19/2/2015.After which seeking of clarification will not be entertained . No further time extension for submission of tender will be given on any account
All other conditions remain unchanged					

CHANGES IN TCC

	Clause Existing	Changes in Clause
Volume 1A,chapter-II,scope of works -Areas of work in TCC	Intake pump house & channel near existing cooling water forebay of NCTPS-stage II with modification of existing forebay at intake point.	Intake pump house & channel near existing cooling water forebay of NCTPS-stage II with modification of existing forebay at intake point. This is situated approximately at a distance of 8 KM from this Plant.
1.2.3of TCC	The area of work shall be cleared of all vegetation, rubbish and other objectionable matter and materials removed shall be burnt or otherwise disposed of as directed by the Engineer-in-Charge. No separate payment for these operations shall be made. The cost of all these operations shall be deemed to have been included in the unit rates rendered for the different items under bill of quantities.	The area of work shall be cleared of all vegetation, rubbish and other objectionable matter and materials removed shall be burnt or otherwise disposed of as directed by the Engineer-in-Charge. The cost of all these operations shall be deemed to have been included in the unit rates rendered for the different items under bill of quantities unless otherwise sepearate item has been provided in the rate schedule..
New Caluse : Page 11 of TCC	New Clause under 1.3.2.1.12 :	Providing hard surfacing (63-40 mm stone approx.. 200 mm thick with a 50 mm layer of morrum well compacted with proper drainage facility integrated with main drain to be provided in Batching Plant, Fabrication yard, Reinforcement yard , Material Storage yard, Office area etc. to facilitate movement of Transit Mixers/Trailors/Cranes etc and quick drainage of water during monsoon. -- In bidder scope
1.3.6.1 of TCC	However, BHEL shall provide only reinforcement steel (TMT) (around 7000 MT) for incorporation mostly for piling work/pile cap work on chargeable basis	However, BHEL shall provide only reinforcement steel (TMT) (around 7000 MT) for immediate start of work on chargeable basis
New Caluse	New Clause under 1.3.6.2 :The contractor shall fulfill all formalities in practice at NCTPS Stage 2 like Obtaining permission for entry of vehicle, follow timings and coordinate with concerned officials for lifting of the reinforcement. These reinforcement shall be lifted and made ready for use in main works at the 1st available opportunity.	
1.3.6.2.6	Structural Steel : Beam Section : 46012/- per MT	Structural Steel : Angle Section : 46012/- per MT
1.3.7.1	Steel will conform to Grade-A of IS:2062 (latest) for rolled steel members or plates upto 20 mm thickness.	Steel will conform to E250 Grade-A of IS:2062 (latest) for rolled steel members or plates upto 20 mm thickness
1.3.7.3.13	New Vendor	Rashtriya Ispat Nigam Limited : RINL
1.3.10	Contractors Obligation on Completion : The vendor must dispose all such scrap only at locations duly approved by BHEL/TNEB. Any debris/scrap disposed haphazardly shall be set right immediately on being observed.	
1.3.14.4	These computers/ printers/ photocopier shall remain your property and they will be allowed to take out the same after completion of the site works. You shall provide data/ information etc in prescribed formats for periodical updating of the progress reports, material management reports, updating of network pertaining to your scope of work etc.	These computers/ printers/ photocopier/Laptop shall remain your property and they will be allowed to take out the same after completion of the site works. You shall provide data/ information etc in prescribed formats for periodical updating of the progress reports, material management reports, updating of network pertaining to your scope of work etc.

	You shall also provide two no's computer operators, one no weighing machine operator and six numbers service staff for miscellaneous service for BHEL's use at site/ Chennai for reconciliation, progress review & day-to-day planning purpose, documentation etc.	You shall also provide two no's computer operators, one no weigh bridge and six numbers service staff for miscellaneous service for BHEL's use at site/ Chennai for reconciliation, progress review & day-to-day planning purpose, documentation etc.
1.4.2 B	T&P for civil works :	Mobilizing time from the date of issue of LOI
1.4.2	New T&P	B 58 : Grader for final grading of area to specified level : 1 no. to be mobilized as per site requirement.
1.6.3 & 1.6.4	In order to meet above schedule in general, and any other intermediate targets set, to meet customer / project schedule requirements, contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL. In case the project is to be advanced, the civil works in the scope of the contractor is to be advanced to meet the project requirement. No extra payment whatsoever shall be paid on this account	Clause to be deleted
1.6.7.1	Boiler Light Up for Unit 2 : 24 months	Boiler Light Up for Unit 2 : 27 months
1.12.4	The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.	The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes to the extent possible.
1.12.5 a)	Colour Progress photographs to accompany the report should be submitted.	Digital Colour Progress photographs with Date to accompany the report should be submitted. Minimum 10 -15 nos. initially and 50-75 nos, during peak construction time to capture detail progress of work.
1.12.5 d)	Category- wise man hours engaged during the previous month under the categories like fitters, electricians, welders, riggers, khalasis, grinder-men, gas-cutters, crane operators, store keepers, lab technicians, helpers, security etc. Data will be spilt up under the work area.	Category- wise man days engaged during the previous month under the categories like fitters, electricians, welders, riggers, khalasis, grinder-men, gas- cutters, crane operators, store keepers, lab technicians, helpers, security etc. Data will be spilt up under the work area.
1.12.5 e)	Consumables report giving consumption of all types of gases and electrodes during the previous month.	Consumables report giving consumption of all types of gases, electrodes, Cement, Steel, etc during the previous month.
1.12.5	New Head	i) Key Events for the Month j) Summary of FQP Report
1.14.4	The contractor shall construct waterproof cement store for initial period (capacity minimum 400 MT) for storing and stacking of cement, CGI/ asbestos roofing (slope) with brick masonry wall, PCC flooring. Materials required for the same shall be provided by contractor at his own cost. Cement has to be kept over wooden raised platform. Stacking of cement is to be done as per IS codes with proper illumination and locking arrangements.	The contractor shall construct waterproof cement store for initial period (capacity minimum 400 MT) for storing and stacking of cement, CGI/ asbestos roofing (slope) with brick masonry wall, PCC flooring. Materials required for the same shall be provided by contractor at his own cost. Cement has to be kept over wooden raised platform or other means to prevent clotting of cement due to ingress of moisture. Stacking of cement is to be done as per IS codes with proper illumination and locking arrangements.
	New Clause	If machine sand is allowed to be used in place of sand, rebate of Rs. 500 per cum shall be given in the relevant concrete item.

VOLUME – II B
CIVIL, STRUCTURAL & ARCHITECTURAL WORKS

SPECIFICATION NO. PE-TS-999-600-C006

SECTION - D

GENERAL TECHNICAL SPECIFICATION

REINFORCED CONCRETE CHIMNEY

Bharat Heavy Electricals Limited
Project Engineering Management
PPEI Building, Power Sector,
Plot No. 25, Sector 16A,
Noida (U.P.)-201301

TABLE OF CONTENT

TECHNICAL SPECIFICATION FOR REINFORCED CONCRETE CHIMNEY

1.0.0 SCOPE

This specification covers reinforced cement concrete works, including steel/brick flues and insulation work, painting and protective treatment work, and other works associated with construction of RCC Multiflue/single flue chimney.

2.0.0 GENERAL

2.1.0 Work to be provided for by the Contractor

Work to be provided by the Contractor, unless specified otherwise, shall include but shall not be limited to the following :

a) Furnish all labour, supervision, services, insurance, material, power, fuel forms, templates, supports, scaffolding, tools, plants, construction equipment, approaches, transportation etc. required for the entire work.

b) Design and prepare working drawings for formworks, scaffoldings, supports, staging hoisting arrangement for men and material etc. and submit them for approval.

c) Prepare and submit for approval, as per approved schedule, detailed drawings for RCC work in shell, platforms at various levels, roof and ground floor and bending schedules for reinforcement bars, showing the positions and details of spacers, chairs, supports, hangers, openings etc.

d) Prepare detailed fabrication and erection marking drawings for steel flues including flue expansion compensators, steel flue supports and restraint arrangements along with fittings and accessories and submit them for approval.

e) Prepare and submit for approval detailed shop drawings, with list of materials and material specifications for Load Bearing Insulation Blocks and Lateral Restraint Insulation Blocks.

f) Prepare and submit for approval detailed schemes for operations like material handling, placement of concrete erection of steel flues, fixing of insulations, installation, dismantling and maintenance of flue expansion compensator etc. and for items like approaches, services etc.

g) Design and submit for approval mix proportions for concrete to be adopted on job.

h) Furnish samples and submit for approval the results of tests for various properties of the following materials :

i) Ingredients of concrete, (ii) Concrete,
iii) Acid/Chemical Resistant Tiles, (iv) Castable refractories, (v) Insulation materials, (vi) Paints. (vii) S/S liner.

i) Provide all incidental items not specified or shown on drawings in particulars but reasonably implied or necessary for successful completion of the work in accordance with drawings and specifications.

j) Produce, if directed by the Engineer, a guarantee, in approved proforma, for satisfactory performance, for a specified period, of material manufactured by specialist firms.

2.2.0 **Work by Others**

No work under this specification will be provided for by agency other than the Contractor for this Contract unless specifically mentioned otherwise in the Contract.

2.3.0 **Codes and Standards**

All works under this Specification, unless specified otherwise, shall conform to the latest revisions/replacements of the following Indian Standard Codes, Criteria, Specifications, along with those mentioned therein. In case any particular aspect of work is not covered by Indian Standards, other standard specification, as may be specified by the Engineer, shall be followed. "IS Specification" shall mean Codes, Criteria etc. of ISI.

IS:6 Moderate heat duty fireclay refractories, Group-A.

IS:104 Ready mixed paint, brushing, zinc chrome, priming.

IS:158 Ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water and heat resisting for general purposes.

IS:195 Specification for fire clay mortar for laying fireclay refractory bricks.

IS:269 Ordinary, and low heat Portland cement.

IS:383 Coarse and fine aggregates from natural sources for concrete.

IS:432 Mild steel and medium tensile steel bars.

IS:456 Code of practice for plain and reinforced concrete.

IS:516 Methods of test for strength of concrete.

IS:732	Code of practice for electrical wiring installations (System Voltage not exceeding 650 Volts).
IS:800	Code of practice for general construction in steel.
IS:813	Scheme of symbols for welding.
IS:814	Covered electrodes for metal arc welding of structural steel.
IS:816	Code of practice for use of metal arc welding for general construction in mild steel.
IS:817	Code of practice for training and testing of metal arc welders.
IS:818	Code of practice for safety and health requirements in electric and gas welding and cutting operations.
IS:822	Code of procedure for inspection of welds.
IS:875	Draft Standard for Code of practice for structural safety of buildings loading standards.
IS:1080	Code of practice for design and construction of simple spread foundations.
IS:1139	Hot rolled mild steel, medium tensile steel and high yield strength steel deformed bars for concrete reinforcements.
IS:1161	Steel tubes for structural purposes.
IS:1199	Methods of sampling and analysis of concrete.
IS:1200	Methods of measurement of building works.
IS:1230	Cast Iron Rainwater pipes and fittings.
IS:1239 (Part-I)	Mild steel tubes.
IS:1367	Technical supply conditions for threaded fasteners.
IS:1526	Sizes and shapes for firebricks (230 mm. series).
IS:1554	Cables.
IS:1566	Hard-drawn steel wire fabric for concrete reinforcement.
IS:1608	Methods for tensile testing of steel products.
IS:1730	Dimensions for steel plate, sheet and strip for structural and general engineering purposes.

IS:1731	Dimensions for steel flats for structural and general engineering purposes.
IS:1786	Cold-twisted steel bars for concrete reinforcement.
IS:1791	Batch type concrete mixers.
IS:1893	Criteria for Earthquake Resistant Design of Structures.
IS:1947	Flood light.
IS:1977	Structural steel (ordinary quality).
IS:2062	Weldable structural steel.
IS:2074	Ready mixed paint, red oxide - zinc chrome priming.
IS:2309	Code of practice for the protection of buildings and allied structures against lightning.
IS:2386 (Part-I)	Methods of test for aggregates for concrete. Particle size and shape.
IS:2386 (Part-II)	Estimation of deleterious materials and organic impurities.
IS:2386 (Part-III)	Specific gravity, density, voids, absorption and bulking.
IS:2386 (Part-IV)	Mechanical properties.
IS:2386 (Part-V)	Soundness.
IS:2386 (Part-VI)	Measuring mortar making properties of fine aggregate.
IS:2386 (Part-VII)	Alkali aggregate reactivity.
IS:2386 (Part-VIII)	Petrographic examination.
IS:2502	Code of practice for bending and fixing of bars for concrete reinforcement.
IS:2505	Concrete vibrators, immersion type.
IS:2506	Screed board concrete vibrators.

IS:2633	Methods of testing uniformity of coating on zinc coated articles.
IS:2722	Portable swing weighbatchers for concrete (single and double bucket type).
IS:2750	Steel scaffoldings.
IS:2751	Code of practice for welding of mild steel bars used for reinforced concrete construction.
IS:2950	Code of practice for design and construction of raft foundations.
IS:3025	Methods of sampling and test (Physical and Chemical) for water used in industry.
IS:3043	Code of Earthing.
IS:3144	Methods of Test for Mineral Wool Thermal Insulation Material.
IS:3346	Method for the determination of thermal conductivity of thermal insulation materials (two slab, guarded hot- plate method).
IS:3495 (Part-I to IV)	Method of test for clay building bricks.
IS:3550	Methods of test for routine control for water used in industry.
IS:3558	Code of practice for use of immersion vibrators for consolidating concrete.
IS:3677	Unbonded rock and slag wool for thermal insulation.
IS:4014 (Part-I&II)	Code of practice for steel tubular scaffolding.
IS:4031	Method of physical tests for hydraulic cement.
IS:4457	Ceramic Unglazed Vitreous acidresistant tiles.
IS:4634	Method for testing performance of batch-type concrete mixers.
IS:4687	Gland packing asbestos.
IS:4832	Chemical Resistant mortars.
IS:4860	Acid-resistant bricks.
IS:4990	Plywood for concrete shuttering work.
IS:4998	Criteria for design of reinforced concrete chimneys.

(Part-I)

IS:5410 Cement paint, colour as required.

IS:5445 Long fluted machine reamers with Morse taper shanks.

IS:5495 Sizes and shapes for firebrick (300 mm. and higher series).

IS:6911 Stainless Steel plate, sheet and strip.

IS:8112 High strength ordinary portland cement.

IS:8183 Bonded Mineral Wool.

IS:9595 Recommendation for Metal Arc Welding of Carbon and Carbon Manganese steels.

CP326 - British Standard - Protection of structures against lightning.

NEPA NO. 78 Code of protection against lightning.

The Indian Electricity Rules.

The requirements of Department of Civil Aviation, Govt. of India.

2.4.0 **Conformity with Drawings and Specifications**

The Contractor shall carry out all the work in strict accordance with the drawings stamped "Released for Construction" and specification issued to him and as per Contractor's detailed drawings approved by the Consulting Engineer. Prior to concreting, the Contractor shall prepare a check list on a set format of all items of work involved, and inform the Engineer well in advance so that the Engineer shall have the opportunity of satisfying himself if the works mentioned in the format are done according to drawings and specification, and he can allow the Contractor in writing to start pouring of concrete. The entire operation of concreting shall be carried on as per specification, to the complete satisfaction of the Engineer. No deviation from the drawings will be allowed unless otherwise directed by the Engineer in writing.

For Load Bearing Thermal Insulation block assembly and lateral restraint insulation block assembly, Contractor shall design sizes of all components of the blocks and details of their connections, supply and fabricate the same in accordance with the approved shop drawings prepared by him.

For steelwork and metal work, the Contractor shall design all connections, inserts for scaffolding, supply and fabricate all steelwork and metal work and furnish all connection materials in accordance with approved shop drawings prepared by

him and/or as instructed by the Engineer, keeping in view the maximum utilisation of the available sizes and shapes for metal components.

2.5.0 **Materials to be used**

2.5.1 **General Requirement**

All materials, whether to be incorporated in the work or to be used temporarily for the construction, shall conform to the relevant IS specifications unless stated otherwise and shall be of the quality approved by the Engineer.

2.5.2 **Cement**

Ordinary Portland cement of grade 43, as per the requirements laid down in IS:8112, shall be used, until otherwise stated elsewhere in the specification.

2.5.3 **Coarse Aggregate**

Coarse aggregate shall be graded crushed or broken stone from approved sources, free from impurities and shall be screened free of dust and other deleterious matter. It shall conform to IS:383 or IS:515 and shall be washed clean, if necessary. The maximum size of coarse aggregate for stack superstructure shall be 25 mm down graded, unless otherwise stated (vide serial 5(b) of clause 3.03.06). Grading for a particular size shall conform to relevant IS Codes and shall be such as to produce a dense concrete of specified proportion and strength and shall be of consistency that will work readily into position without segregation.

2.5.4 **Fine Aggregate**

Fine aggregate shall be river or pit sand, free from any clay, earth, vegetable matters, salt or other impurities and shall be clean and fit for use, to the satisfaction of the Engineer. Sand acceptable for the work shall normally have a grading falling within the limits of one of the three grades, mentioned in the relevant IS Specifications.

2.5.5 **Water**

The water for both mixing and curing of concrete shall be clean, free from oil, acid, alkali, organic or other deleterious substances. Contractor shall test the water as and when required by the Engineer.

2.5.6 **Reinforcement**

Mild steel or Medium or High Tensile steel deformed bars specified for reinforcement shall conform to the latest relevant IS Specifications and shall be of tested quality under ISI Certification Scheme. The reinforcement shall be free from any oil, foreign material or mill or rust scales.

2.5.7 **Steel Flue**

a) All mild steel material to be used in construction of steel flue shall comply with IS:2062, IS:1239, IS:1367, IS:1608, IS:800 and with other

relevant IS Specifications. The ultimate tensile strength of this steel shall not be less than 410 N/Sq.mm.

b) Stainless steel liners shall be fabricated using materials conforming to the requirements of relevant IS Specifications and/or AISI 316L or BS:1449 Part-2. Grade of Stainless steel shall be equivalent to BS:1449 (Part-2) 316 S.12.

c) Materials to be used for fabrication of Flue expansion compensator shall be suitable for the flue gas tempeature and shall be acid resisting.

The Expansion compensator shall comprise several layers of materials given below in order from the gas side.

i) Two layer of insulation, each consisting of heavy weight texturized glass cloth impregnated with graphite suspension, having an approximate weight of 1.00 Kg/Sq.m

ii) A continuous filament glass cloth coated both sides with a flouro-elastomer having an approximate weight of 1.5 Kg/Sq.m.

iii) Two layers of PTFE (Poly Tetra Flouro-Ethylene) film of minimum thickness 0.15 mm each.

iv) A layer of glass felt of minimum thickness 10 mm and an approximate weight of 1.5 Kg/Sq.M.

2.5.8 **Paints**

Paints to be used for shop coat of fabricated steel shall conform to the IS:2074. Paint for treatment of outside face of Chimney with Cement water proof paint shall conform to IS:5410.

2.5.9 **Acid Resistant Tiles and Castable Refractories**

Acid resistant tiles to be provided over roof of stack should conform to IS:4457. Matching mortars to be used for tiles. Castable refractories shall be of hydraulic setting, rapid hardening type. It shall have refractory properties similar to Fire bricks conforming to IS:6, Group-A and working temperature shall be upto 1350 Deg.C.

2.5.10 **Insulations**

a) **On Exterior Surface of Flues**

The normal flue gas temperature inside the flue shall be 145 Deg.C with momentary rise upto 400 Deg.C (Maximum) occasionally. The insulation material shall be able to withstand this temperature without any deterioration in thermal properties or breakdown. The thermal conductivity of the insulating material shall not exceed 0.06 W/M Deg.C at a mean temperature of 150 Deg.C. The insulation shall also not be affected by any acid condensation from flue gas and shall be free from any impurities which may cause corrosion to the flue material.

For steel flues 65 mm thick semi rigid resin bonded fibrous mineral wool of density not less than 96 Kg/Cu.m as per IS:8183 or resin bonded fibrous crown glass wool (high temperature) of same thickness and density not less than 36 Kg/Cu.m capable of sustaining temperature to the tune of 540 Deg.C without any loss of material thermal property, may be used. The mineral wool for exposed top portion of flue shall be semi-rigid with minimum density of 200 Kg/Cu.M or the glass wool for exposed top portion of flue shall have minimum density of 75 Kg/Cu.M.

Slag wool insulation shall not be accepted.

The insulation free from shots should be supplied in the form of mat to be fixed with staggered joints on outer surface of the flue with suitably spaced stud by galvanised wire mesh. Insulation on the top portion of flue shall be covered by stainless steel cladding.

b) **At Load Bearing and Side Restraints of Flues**

Load bearing insulation assembly to have (i) a properly mechined mild steel plate with recess at its top for seating PTFE (Poly Tetra Fluoro Ethylene) sheets conforming to BS:5400 (ii) saddle plate (MS) in the middle having stainless steel plate fixed at its bottom surface and lead/elastomeric sheet at top, and (iii) top plate formed of two numbers insulation blocks each made of minimum 50mm thick rigid, non-combustible asbestos fibre reinforced lime-silica board (SINDANYO BLOCKS NATURAL GRADE CS-51) bonded to mild steel plates at top and bottom. For side restraints assembly of insulation blocks of SINDANYO Natural Grade CS-51 and stainless steel plate shall be used. All stainless steel in these assemblies shall conform to AISI-316L and Mild steel to IS-2062. SINDANYO BLOCKS shall be suitable for operation at 320 Deg.C and shall primarily satisfy the following physical prolperties :

i) Minimum compressive stress prior to onset of compression yield of not less than 12 N/Sq.mm.

ii) Minimum shear strength of 30 N/Sq.mm when tested in accordance with BS:3497-1979.

iii) Thermal conductivity shall not exceed 0.67 W/m Deg.C at a mean temperature of 200 Deg.C and its coeff. of linear expansion not to exceed 1.2×10^{-5} per Deg.C.

iv) Adhesive used for bonding purposes shall be of material with equivalent high temperature properties as approved by the Engineer. It may be of "Fortafix Fiborclad Adhesive" as manufactured by Fortafix Ltd., England.

2.6.0 Storage of Materials

2.6.1 General

All materials shall be so stored as to prevent deterioration and intrusion of foreign matter and to ensure the preservation of their quality and characteristics for the work. Any material, which is deteriorated or is damaged or is otherwise considered defective by the Engineer, shall not be used for construction and shall be removed from site immediately, failing which the Engineer shall be at liberty to get the materials removed. The Contractor shall maintain an upto date accounts of receipt, issue and balance of all materials issued by the Owner.

2.6.2 Cement

Contractor shall store cement in water-tight and properly designed stores so that the Cement can be kept dry and the stock can be handled in rotation. The doors of stores shall be at least 30 cm. above G.L. Deteriorated cement shall be removed immediately from the site. Not more than ten bags of cement shall be stacked one above the other.

2.6.3 Aggregate

Different materials shall be transported, handled and stored separately in such a manner as to prevent damage, deterioration or contamination. Stock piles of fine and coarse aggregates shall be allowed to drain, so that aggregates do not contain too much water.

2.6.4 Reinforcement

Reinforcement shall be stored preferably under cover and stacked off ground in size and grade-wise separate stacks for easy identification.

2.6.5 Steel, Metal and Fittings

All steel, metal and fittings to be used for fabrication and erection shall be stored sectionwise and lengthwise in separate stacks, off ground, so that they can be handled, inspected, measured and accounted for easily at any time. If required by the Engineer, the materials may have to be stored in a covered shed.

2.6.6 Paints

Paints shall be stored under cover, in air-tight containers. Paints supplied in sealed containers shall be used as soon as possible once the container is opened. Left over paints shall be kept in air-tight containers.

2.6.7 Steel Flue

Fabricated pieces of steel (flue) liner shall be stored systematically for ease of handling.

2.6.8 **Insulation Material**

All insulation materials like bearing insulation blocks, restraint insulation blocks, glass or mineral wool, asbestos ropes etc. shall be stored in packing boxes, under covered shed, avoiding their coming in contact with objectionable matter.

2.7.0 **Quality Control**

Contractor shall establish and maintain quality control for different items or work and materials as may be directed by the Engineer to assure compliance with contract requirement and submit to the Engineer records of the same. The Contractor shall submit all records and test results in original to the Engineer for his approval, if so desired by him.

The quality control operation shall include but shall not be limited to the following items of work :

a)	Cement	:	Test to satisfy relevant IS Specifications if supplied by the Contractor.
b)	Aggregate	:	Physical, Chemical and Mineralogical qualities, grading, moisture contents and impurities.
c)	Water	:	Impurities Test.
d)	Reinforcement:		Material tests or certificates to satisfy relevant IS Specification if supplied by the Contractor.
e)	Structural Steel	:	Material tests or certificate to satisfy relevant IS Specification if supplied by the Contractor.
f)	Steel flue	:	Material tests or certificate to satisfy relevant IS Specification if supplied by the Contractor.
g)	Stainless Steel	:	Material tests or certificate to satisfy relevant IS Specification if supplied by the Contractor.
h)	Acid Resistant	:	Compressive and tensile strength, acid tiles& mortar resistance and water absorption test.
i)	Mortar	:	Compressive and tensile strength, adhesion and acid resistance test.
j)	Insulation	:	Thermal conductivity, density, heat and acid resistance tests. Bearing capacity will be tested for bearing/restraint insulation blocks.

3.0.0 EXECUTION

3.1.0 Concrete

3.1.1 Trial Mix, Grades of Concrete

At least three weeks before commencing any concreting in the work the Contractor shall make trial mixes using samples of coarse aggregates, sand, water and cement, typical of those to be used in the work. A clean dry mixer shall be used for mixing and the first batch shall be discarded.

For guidance in designing the mix, standard tables for maximum allowable water-cement ratio, minimum cement content, maximum proportion of aggregates and limits of consistency may be used by the Contractor. The Contractor's design mix shall fall within limits of the following tables :

i) Strength requirements of concrete : Table-2 of IS:456-2000.

ii) Concrete Mix Proportion : Table-3 of IS:456-2000.

iii) Minimum cement content/Cu.m. of finished concrete shall be as per Table 5 of IS 456-2000.
However, it should be noted that minimum cement content for concrete of chimney shell of grade M30,M35,M40 shall be 400kg, 430 kg and 450 kg respectively.

iv) Limit of consistency : Refer Table in Item 3.1.4 of this specification.

v) Cement/Total Aggregate Ratio : As per the following table.

MIX PROPORTIONS (BY WEIGHT) EXPECTED TO GIVE DIFFERENT DEGREES OF WORKABILITY WITH DIFFERENT VALUES OF WATER - CEMENT RATIO (FOR GUIDANCE)

CEMENT/TOTAL AGGREGATES RATIOS

Workability	Water/ Cement Ratio	Ratio by Weight of Cement to Gravel Aggregate		Ratio by Weight of Cement to Crushed Stone Aggregate	
		20 mm. Size	38 mm. size	20 mm. size	38 mm. size
Very Low slump 0-25 mm.	0.4	01:04.8	01:05.3	01:04.5	1:05
	0.5	01:07.2	01:07.7	01:06.5	01:07.4
	0.6	01:09.4	1:10	01:07.8	01:09.6
	0.7	1:10	1:12	01:08.7	01:10.6
Low slump 25-50 mm	0.4	01:03.9	01:04.5	01:03.5	1:04
	0.5	01:05.5	01:06.7	1:05	01:05.5
	0.6	01:06.8	01:07.4	01:06.3	1:07
	0.7	1:08	01:08.5	01:07.4	1:08
Medium slump 50-100mm.	0.4	01:03.5	01:03.8	01:03.1	01:03.6
	0.5	01:04.8	01:05.7	01:04.2	1:05
	0.6	1:06	01:07.3	01:05.2	01:06.2
High slump 100 - 175 mm.	0.4	01:03.2	01:03.5	01:02.9	01:03.3
	0.5	01:04.4	01:05.2	01:03.9	01:04.6
	0.6	01:05.4	01:06.7	01:04.7	01:05.7
	0.7	01:06.2	01:07.4	01:05.5	01:06.5

NOTE-1 : Notwithstanding anything mentioned above, the cement / Total aggregate ratio is not to be increased beyond 1:9 without specific permission of the Engineer.

It should be noted that such high aggregate cement ratios will be required for concretes of very low slump and high water-cement ratios which may be required to be used in mass concrete work only.

NOTE-2 : The above figures are for guidance only, the actual cement/ aggregate ratios are to be worked out from the specific gravities of coarse aggregates and sand being used and from trial mixes. For each grade of concrete, a set of eighteen cubes shall be made. Of these not more than six may be made on any day and further, of the six cubes made in one day not more than two cubes may be made from any single batch. Nine of these cubes each representing a different batch of concrete shall be tested at the age of seven days and remaining at twenty eight days. The making of the cubes, their curing, storing, transporting and testing shall be in accordance with the relevant IS Specifications. The test shall be carried out in laboratory

approved by the Engineer. If the average strength of the concrete cubes falls below the requirement, the method described above shall be repeated till acceptable results are obtained. The method may have to be repeated whenever there is a significant change in the quality of any of the ingredients for concrete, at the discretion of the Engineer.

3.1.2 Batching of Concrete

For controlled concrete, only weigh batching shall be allowed. All concrete ingredients, except water, shall be batched by weight, using an approved make of weigh batcher. Batching shall be accurate to 1/2 Kg. The batcher shall be tested for accuracy of calibration, first before commencement of work and at least once a fortnight or as directed by the Engineer thereafter. Water shall be batched by weight or by volume measures, as approved by the Engineer.

3.1.3 Mixing of Concrete

Materials for concrete shall be emptied in rotation into the mixer. When all the ingredients are in the drum, the drum will rotate for one minute for dry mixing. After that water shall be added in measured quantities in the manner specified. The mixer shall then rotate for at least two minutes, or at least forty revolutions or until there is apparent uniform distribution of the materials and till the mass is uniform in colour. The entire content of the drum shall be discharged before the ingredients for the succeeding batch are fed into the drum. The mixer shall be thoroughly cleaned to the satisfaction of the Engineer, before a different quality of concrete is put through the mixer and also at the end of day's work.

3.1.4 Workability of Concrete

The degree of workability necessary to allow the concrete to be well consolidated and to be worked into the corners of formwork and around the reinforcement and embedments, and to give the required surface finish shall depend on the type and nature of structure and shall be based on experience and tests.120 mm to 150 mm, where concrete is pumped, otherwise, 100mm-120mm slump in chimney shell works shall be adopted subject to Engineer's approval unless stated otherwise (vide serial 1(d) of clause no. 3.3.6). The usual limits of consistency for various types of structure are given below:

LIMITS OF CONSISTENCY

Degree of Workability	Slump in mm. with Standard Concrete		Use for which Concrete is suitable
	Min.	Max.	
Very Low	0	15	Large mass concrete work with heavy compaction equipment.
Medium	35	65	Deep and wide RCC structures with congestion of reinforcement and inserts.
High	65	100	Very narrow and deep RCC structures with congestion due to reinforcement and inserts.

NOTE: The above table is for guidance only. Notwithstanding anything mentioned above, the slump to be obtained for work in progress shall be as per direction of the Engineer.

With the permission of the Engineer, for any grade of concrete, if the water has to be increased in special cases, cement shall also be increased proportionately, to keep the ratio of water to cement same, as adopted in trial mix design, for each grade of concrete.

The workability of concrete shall be checked at frequent intervals by slump tests. Alternatively, where facilities exist or if required by the Engineer, the compacting factor test, in accordance with IS:1199, shall be carried out.

3.1.5 **Placing and Compaction of Concrete**

Concreting shall proceed in a manner directed by the Engineer, concrete shall be placed in forms as soon as possible but in no case later than twenty minutes, after mixing.

The height of any single lift of concrete, for different structural members, shall be decided by the Engineer. The concrete shall be placed in the forms gently and not dropped from a height which may cause segregation of aggregates. Each layer of concrete shall be compacted fully before the succeeding layer is placed and separate batches shall follow each other so closely that the succeeding layer shall be placed and fully compacted before the layer immediately below has taken an initial set.

The concrete, after placing, shall be consolidated only by power driven vibrators. The vibrators shall be of a make and size, approved by the Engineer. In using the vibrator, the standard practice and the Engineer's directions, shall be followed.

Vibration shall begin as soon as one batch of concrete has been placed and shall continue till the entire section being poured has been thoroughly consolidated.

To secure even and dense surfaces, free from aggregate pockets, vibration shall be supplemented by tamping or rodding by hand in the corners of forms and along the form surfaces while the concrete is plastic, without damaging or endangering the stability of the formwork.

A sufficient number of spare vibrators including petrol vibrators shall be kept readily accessible to the place of deposition of the concrete to assure adequate vibration in case of breakdown of those in use.

3.1.6 Curing of Concrete

Curing of exposed surface of concrete shall commence immediately after the concrete has set. Exposed sides shall be covered with canvas etc. immediately after stripping of forms, and curing shall be continued for a period of not less than 14 days, reckoned from the date and hour of completion of concreting. All surfaces of the pour shall be kept wet with water at all times after concreting and till the curing period is over. The Contractor shall plan and employ proper equipment and sufficient labour considered adequate by the Engineer under able supervisor for curing.

3.1.7 Construction Joints

In concreting the chimney shell one full ring lift shall be completed in a day's pour. Before the formwork for the following pour starts the horizontal surface of the Chimney shell shall be chipped, cleaned and washed with water, and when the formwork is complete, the surface shall be cleaned and washed again and covered with 1:2 sand cement slurry before fresh concrete is placed. The horizontal construction joints shall be so arranged and made that they are regular and neat. No vertical joint shall be allowed. No separate payment shall be allowed to the Contractor for forming joints or chipping and cleaning them or cover with slurry prior to concreting. The number of construction joint shall be kept minimum and the spacing should not exceed three (3) meters. The Contractor shall submit to the Engineer, any proposal of providing construction joints to facilitate his work, for the study and approval of the Engineer well in advance.

3.1.8 Ordinary Concrete

Ordinary concrete like lean concrete shall be of nominal mix as per relevant clauses of IS:456.

3.2.0 Reinforcement

3.2.1 Bending of Reinforcement

All bars shall be carefully and accurately bent by the Contractor in accordance with approved Drawings and bar bending schedules. Special care shall be taken to ensure correct lengths of laps. The bars shall not be bent or straightened in any manner that will injure the bars or impair the bond

between reinforcement & concrete. Bends and hooks are to be provided as laid down in the IS:2502.

3.2.2 **Placing**

All reinforcement shall be placed and maintained in the position shown in the drawings. Contractor shall provide approved type of cover blocks to suit the requirement of the Drawings. Where reinforcement is to be provided on two faces of the shell, the Contractor shall provide adequate number of separators, with the approval of the Engineer. Any additional support to the reinforcing cage, if required at the time of concreting, shall also be provided, to the satisfaction of the Engineer. Lapping of reinforcement as specified in the drawings or as directed by the Engineer, shall be provided. Laps shall be staggered and too many laps shall be avoided. Welded laps shall be provided only when directed or approved by the Engineer.

3.2.3 **Fixing of Reinforcement**

18 SWG annealed steel wire shall be used as binding wire. Bar crossing one another and contact laps shall be bound with this wire twisted tight to make the skeleton or network rigid so that the reinforcement is not displaced during placing of concrete.

3.10 **Forms**

Construction by Slip-form Method

Slip-form construction shall be for construction of the wind shield. Type of Slip-form proposed should be indicated in the offer with sketches, drawings and construction statement as explained hereinafter. Number, type and capacities of jacks, the control system and achievable rate of progress in mm/hour should also be indicated. The chosen scheme shall be of a past proven design. A certified performance record of the scheme should be submitted with the offer to guarantee workability of the scheme both from execution time and safety point of view.

The Tenderer should furnish a brief but commprehensive statement indicating the planning & programme and method of work to be followed, for the approval of Owner at the time of submitting Tender. This statement shall include the following items:

i) Type and description of Slip-form equipment and its accessories.

ii) Design of scaffolding and staging.

iii) Description of materials including admixtures to be used for construction.

iv) Manpower planning, construction spaces required, standby arrangement.

vi) Rate of Slip-forming.

vii) Proposed workability requirement of concrete and type of cement & admixture to be used.

viii) Quality assurance programme.

ix) Method of Traansportation of material

x) Method of curing and rectification of defects.

xi) Planned interruption, if proposed, and activities during planned interruption. Treatment of construction joint.

xii) Contingency solution for unplanned interruptions.

xiii) Time of completion.

While selecting the Contractor, due consideration will be given to the merit of the above mentioned statement proposed by the Tenderer.

Not withstanding what have been specified in earlier clauses, following guide lines are being presented which should be kept in view by intending Tenderers, while quoting for Slip-form method of construction:

1. Care to be taken to prevent dragging of concrete along with upward movement of the shuttering. For this purpose following steps are advisable:

   a) Shutter plates have to be smooth and should be thoroughly clean. Before fixing them in position all the surfaces which will be coming in contact with concrete to have a coat of epoxy paint.

   b) In areas where concrete thickness is 750 mm or more, rate of pouring should be such that minimum slipping of shuttering is maintained to avoid initial set of concrete before slip form movement.

   c) Mix design should be so done that it will be self- lubricant at the contact face of shutter and concrete and thus reduce friction. Suitable cement of approved manufacturer (conforming to relevant I.S. Specification) may be used for the purpose. An optimum ratio of coarse/fine aggregate should be established to suit the purpose depending on availability of aggregates.

   d) Mix design also should be so done that it has a slump of around 100mm-120mm, at the point where concrete is placed under an ambient temperature of around 40 Deg.C. This will also keep vibration by needle vibrators to required minimum. Slump should not drop down to zero in less than 45 minutes. Suitable retarding agent and plasticizer of approved manufacture may be added in mix to achieve this purpose. These admixtures to be properly identified by preliminary tests both for performance and for compatibility with particular type of cement proposed to be used.

   Additional steps like spraying of water over the shutters and keeping down the temperature of coarse aggregates by continuous spraying of water over those may be resorted to if ambient temperature is more than 40 Deg.C.

2. Care must be taken to prevent twist, which predominantly occur in the initial stages because of low slipping rate, in the horizontal plane of Slip-form assembly. A thorough check on this aspect must be kept at every 15 minutes interval. One person should exclusively be assigned this work together with rectifying any defect.

3. Every endeavour has to be made so as not to occur any tilt in the shutter assembly. To achieve this following steps need be taken:

   a) Performance of jacks has to be closely observed and any defective one needs immediate replacement. Difference in

levels of opposite jacks at any instant of time should not exceed 5 mm.

b) Loading on Slip-form truss/yokes has to be fairly equal.

c) Sleeve through which jacking rod passes has to be of sufficient length so that later gets an uniform clearance and does not get any chance to tilt. Sleeve should have a minimum wall thickness of 3.25 mm and should be such that jacking rod gets a maximum clearance of 1 mm to 1.5 mm around.

4. For taper walled chimneys overlapping of shutters which are kept to effect the tapering, needs careful attention otherwise these may be filled with concrete slurry.

5. In designing the mix following aspects should be borne in mind:

a) Cement used should have an initial setting time of not less than 50 minutes and preferably should have a specific surface around 3600 Sq.Cm.per gram.

b) Coarse and fine aggregates should be well graded and rounded aggregates offer better performance in Slip-form technique. These help to keep down water/cement ratio and also offers better lubrication between concrete and shutter surface. 40 mm down size of coarse aggregates should preferably be used unless reinforcement detailing calls for lesser size aggregates.

c) From the point of view of creep, shrinkage as well as initial setting property of concrete, cement content should not preferably be more than 450 Kg. per Cu.M of concrete.

d) Minimum compressive strength (after 4 to 6 hours of mixing) of concrete immediately below the shutter as slipform proceeds should be between 0.1 to 0.2 Newton/ Sq.mm.

e) It is advisable to use cement from a single source during the entire operation of slipform technique since once the system starts, there might not be any time left for conducting trial mixes if the source of procurement of cement changes.

6. Large diameter vibrator needles should not be used for vibrating concrete. Sizes of these needles should preferably be restricted to 25 mm diameter and to 40 mm diameter - only in exceptional cases. At least two nos. standby vibrator units should always be maintained on top of working deck at all time during the entire period of slipform operation.

7. It is preferable to have membrane curing compounds sprayed on fresh surfaces emerging out of shutter panels for ensuring proper curing at great heights.

   In case such spraying is not envisaged then elaborate arrangement has to be made for adequate supply of water both on inside and outside vertical surfaces with spraying arrangement, necessary length of pipelines and pump of adequate head to serve the purpose. It is always advisable to have a stand-by pump for effective utilisation of the system.

8. Rate of slipping should be around 100 mm – 150mm per hour, subjected to a maximum limit of 3.0 m per 24hrs.

9. Exact number and capacity of jacks as well as spacing of yoke frames are to be determined taking into account various loadings including self weight of the system, dead and live loads on working and other platforms, horizontal load on formwork, wind load etc.

   It is desirable that jacking system, based on which the entire slip form system works, should consist of jacks 3 Tonne/ 6 Tonne capacity and a hydraulic pump with necessary pipe connections.

   Spacing of yoke legs should preferably be kept within 2 metres to prevent overloading on jacks and consequent failure resulting in twist of the formwork.

   Jacking rods should be of 25 mm diameter for 3 Tonne Jacks and 32 mm diameter for 6 Tonne Jacks.

10. At least 30% spare jacks and jacking rods should be kept ready during the entire operation. It is obligatory to maintain spare hydraulic pump along with a set of loose pipes in perfect working condition on top of working deck.

11. In sections where thickness is 500 mm or more it is prudent to go in for two nos. of jacks for each slip form yoke.

12. For effective utility of this technique following areas need careful attentions at the very conceptual stage:

    a) Detailed quality assurance programme.

    b) Advance Planning and preparations.

    c) Arrangement for on site supervision and adequate access facilities.

13. Construction methods including description and types of different equipment proposed to be used, structural arrangement and analysis of the system, description and type of different materials, planned interruptions, description and frequency of various checks and tests for Slipform technique as well as for material, method of preparing, transporting and pouring of concrete, solution for probable defects during slipping, sequence of operations during planned interruptions etc. should be prepared beforehand by executing agency and to be approved by Engineer before starting the actual work.

14. Placing and binding of reinforcement is also a very critical item and needs special attention. From practical considerations not more than two or three layers of horizontal steel can be tied at a time and this causes a definite limitation in placement of reinforcement.

    Vertical reinforcements should be kept vertical by providing suitable holders within the slipform system.

15. It is desirable to have a break of at least one day for every two weeks of continuous operation. Such break should be utilised for various maintenance activities, removal of jack rods etc.

16. Numbers and locations of hoists for lifting concrete, reinforcement and other materials have to be planned well in advance. Capacity of hoists should be such as to match with hourly requirement of concrete and reinforcement. If felt necessary one hoist may be exclusively earmarked for transporting concrete.

    For movement of personnel supervising the work a seperate hoist must be arranged for.

17. The system being operative round the clock it is obligatory to have adequate lighting arrangement both on various platform levels as well as on ground below. Arrangement has to be made for facilitating continuous upward movement of the entire system alongwith slipform.

18. Winches for lifting men and material and mixers, if located within unnsafe area around chimney, should be protected by adequate shelter from possible damage.

19. Proper tele-communication system has to be established between the personnel working on top of Chimney and control room below.

20. A small laboratory should be maintained at site for testing different materials like cement, coarse and fine aggregates. A cube testing machine may also be installed at site for getting quick feed back results.

    Apart from using plumb bobs, level and theodolite instruments for survey purpose arrangement should also be kept for lasers.

21. In case of interruption in the course of slipping of formwork following measures should be taken:

a) Provision of a key and additional reinforcement at the junction of new and old concrete.

b) Slip form system should be brought up freely to have a minimum overlap of 100 mm or so over previously cast concrete.

c) Washing of old concrete surface with compressed air and water jet and thereafter pouring a layer of neat cement grout.

d) Clearing of shuttering panels of loose materials, concrete etc. by compressed air and applying a coat of epoxy paint, if felt necessary by Engineer.

e) Neatly finishing the interface of old or new concrete as soon as it comes out of shutter panel.

22. It is preferable to suspend the construction work under high wind condition.

23. It is of utmost importance that for effective implementation of this system an Engineer fully conversant with Slip form technique with enough experience in planning and control of formwork should be in overall command of the site and he should be ably supported by well trained mid level supervisory staff, skilled workers and operators, having experience of similar construction in past. It is to be noted that enough manpower (as agreed by owners engineer at site) of above mentioned quality, is always ensured at site for smooth and uninterrupted work of slip form.

24. Operation of slip form method of construction is a continuous one and it demands continuous/intermediate inspection of accuracies in line, level, dimensions and position and immediate rectification of any noticed deviation. All these ask for personnel of high quality having constant vigilance over the construction activity.

25. While all the activities in effective implementation of the work needs utmost care keeping safety of men and material in mind it is obligatory that all activities should be carried out under the guidance of a qualified and trained safety Engineer.

26. For smooth and unhindered supply of concrete, while the slip form is in operation, it is desired that batching plant for concrete of chimney shell be placed in close proximity of chimney shell. However, all the safety measures required for placing batching plant close to shell must be ensured.

Safety measures as listed below must be adhered to but should not be limited to only these:

a) Safety helmets and belts to be provided to all supervising staff and workers.

b) Safety nets to be provided below both inside and outside platforms as instructed by Engineer.

c) Hand railing and toe guard to be provided around all openings and platforms.

d) Regular maintenance of equipment, checking of hoists, scaffoldings etc.

e) Passenger hoist must have multiple ropes with adequate factor of safety.

f) Emergency lights, coloured lamps to be provided in accordance with relevant Indian Standards and as supplemented in the Specification and to be operative in case of sudden power failure Emergency standby generator must be kept ready during the entire period of slipform method of construction.

g) Emergency vehicles, first aid facilities must be kept ready during the entire period of work.

26. Permissible construction tolerances should be limited to the following:

Variation in wall thickness	:	(-) 5 mm, (+) 25 mm
Variation from Design Diameter	:	(±) 25 mm or (±) 2.5 mm per 3 m dia. whichever is larger, but in no case more than (±) 5 mm.
Out of Plumb in General	:	1 in 1000 of height subject to a maximum of 200 mm.

3.4.0 Steel Flues

3.4.1 General

Fabrication and erection of Steel Flues shall conform to "Technical Specification for Fabrication and Erection of Structural Steelworks" furnished in this Specification.

3.4.2 Fabrication

Plates out of which flues will be fabricated, should be bent to the required shape on an appropriate machine. No smithy process shall be adopted for the purpose. Plates are to be prevented from distorting by more than the tolerances specified during transportation, storage, handling, erection and

jointing. All components should be correctly located and brought into correct alignment and level within specified erection tolerances, before adjacent pieces are jointed or secured.

3.4.3 **Assembly**

Each flue would be assembled from its Component "Cans" near to ground level within the wind-shield. Incomplete flue would be hung only from the flue support platform during assembly, and progessively hoisted to enable connection of further cans at its lower end. Upon completion of the initial sectional length, this length will be hoisted and supported in its final position at the flue support floogr as indicated in the drawing. It is envisaged that each flue will be assembled and hoisted in three sectional lengths; site joints between sectional lengthy being located just above a steel floor level.

Joints between individual cans should be flanged and bolted on outside and to have sealed welded joints on inside in accordance with clause 3.3.0 - "Welded Construction" under Technical Specifications" for Fabrication of structural steel work. The Contractor shall submit a drawing showing proposals for erection and indicating locations of all site joints which should be kept to minimum.

3.4.4 **Flue Expansion Compensator**

For installation of Expansion Compensators, the manufacturer's instruction should form the basis of the Contractor's method. This method, in a statement, should be submitted to the Engineer for approval. Once approved it has to be followed throughout the installation sequence. Expansion Compensators should be prevented from distortion during transportation, handling, erection and jointing, by more stringout tolerances than specified by the manufacturer.

3.4.5 **Tolerances**

Permissible tolerances in the fabrication and erection of steel flues are given below :

a) Internal diameter shall not vary by more than : ± 12 mm

b) Centre of any section shall not be eccentric from vertical centre line by more than : 10 mm in any 15 metre height

c) Centre of any section at height ‘h' is in mm. above GL shall : (h/2500 + 10)mm, not be vertical centre where line by more than

d) Local deviation from a true circular form should not exceed the shell

thickness (Measurement should be made from a segmental circular template having radius of flue shown in drawing and a chord length equal to 0.15 of that radius).

e) Peaking or stepping at welded horizontal seams shall not exceed 4 mm. (Measurement shall be made with a straight edged template long enough to contact the straight shell on either side of the peaked area).

3.4.6 Erection

Erection of Steel Flues and C.I. Chimney caps shall be done as per requirement of IS:800. The Contractor shall submit to the Engineer a programme of erection for his approval. All plant, equipment, tools, tackle and any other accessories required for the erection shall be provided by the Contractor. Storing and handling of fabricated materials for erection, setting out of members, providing temporary supports, bracing, fasteners, bolts, nuts etc. shall be the responsibility of the Contractor and shall be taken into account in quoting the rate.

3.5.0 Insulation and Protective Treatment

3.5.1 Acid and Heat Resistant Paint

Top 15 meters of the outside face of R.C.C. windshield horizontal surface at the top of windshield and inside face from the top of the windshield to the top of roof slab or as specified in the drawing shall receive a protective treatment of three coats of acid and heat resistant black paint. The quality and type of the paint shall have the prior approval of the Engineer. For this, a small area shall be painted and a sample of paint shall be shown to the Engineer.

The surface to be painted shall be prepared and primary coat, if required as per the paint manufacturer's specification and direction of the Engineer, shall be applied. The paint shall conform, unless otherwise stated, to the requirement of IS:158. Necessary samples, test certificates and manufacturer's literature shall be submitted to the Engineer for his approval. The surface to be painted shall be completely dry before the paint is applied and the drying time between consecutive coats shall not be less than 5 hours. The overall combined thickness of paint shall be a minimum of 230 microns.

3.5.2 Cement Paint

The outside face of the Chimney shell, unless specified otherwise, shall be painted with Cement water proof paint. The quality shall be approved by the Engineer. Necessary samples shall be submitted to the Engineer for his approval. The surface of the shell shall be prepared as per paint manufacturer's specification. In addition, care shall be taken that the surface is free from stain, honey comb and any rough and uneven surface. The joints between two shuttering and two lifts of shuttering shall be so prepared that any uneveness, if by chance exists, shall be removed. If one coat of paint is not sufficient to give the required finish, the Contractor shall repaint the surface, until the Engineer is satisfied with the workmanship. The paint shall conform, unless otherwise stated, to IS:5410. Necessary samples, test

certificates and manufacturer's literature shall be submitted to the Engineer for approval.

3.5.3 **Insulation and Packing**

All insulation material should be of dimension and type, shown in the drawing. Load bearing insulations at supports and side restraints of Steel liners should be an assembly of M.S. Plates, Stainless Steel Plates, PTFE (Poly Tetra Fluoro Ethylene) sheets and or/asbestos fibre reinforced boards (SINDANYO BLOCKS). Insulation to be fixed on outer surface of steel flues should be made of glass or mineral wool.

a) **Load Bearing Insulation Block**

Load bearing assembly should consist of three units and be fabricated according to approved drawings. It would be fabricated from mild steel units with a stainless steel sheet bearing plate and load bearing insulation blocks as indicated in drawing.

The first unit is bolted to the supporting beam. It consists of a M.S. base plate with bolt holes on which a machined M.S. plate is welded. This plate is provided with recess for PTFE sheet (conforming to BS : 5400) to seat, being lubricated with silicon grease.

The second unit also consists of a M.S. plate having adequate size & thickness as shown in drawing. While one surface of the plate is provided with a stainless steel bearing plate the other surface has a thin layer of lead/ elastomeric sheet. The side having stainless steel surface is placed on PTFE surface of First unit.

The third unit consists of two layers of load bearing insulation blocks each having a minimum thickness of 50 mm and factory bonded to top & bottom M.S. plates. These are separated by 100 mm. long load bearing insulation dowels as shown in the drawing. These plates are in turn welded to two additional M.S. plates. Of the two surfaces thus created one shall be welded to bracket assembly while the other should rest on the lead sheet of second unit. Bearing assembly, thus formed, should be levelled by using suitable M.S. shims.

Support arrangement typically consists of flue support shoe (a part of flue), flue support bracket connected to the shoe by precision bolted connection. The bracket in turn is welded to the bearing assembly, which in turn is bolted to available supporting beams.

Support brackets and bearing assembly are welded to locally thickened area of flue. These support the flue on support platform at suitable locations indicated on the drawing.

The arrangement described above should cater for easy and smooth thermal movements of linear element. Suitable restraint brackets and M.S. stop plates need be provided as shown in drawings to prevent excessive movement and thus keeping different units of bearing assembly in proper position.

b) **Insulation Block at Lateral Restraints**

At flue restraint platforms, necessary restraint arrangement with load bearing insulation blocks and stainless steel bearing plates fixed to the insulation blocks should be provided as indicated in drawings.

Restraint and support brackets need be provided for the bottom supported portion of the flue which rests on the support platform provided at the base to cater for bearing and restraint requirements.

c) **Glass or Mineral Wool**

Insulation thickness of 65 mm as is specified in clause 2.05.10 shall be built up using two (2) layers composed of 40mm and 25 mm thick insulation blocks. Thicker layer shall be put as first layer around the flue on its exterior surface.

The insulation on the flue shall be fixed using chicken G.I. wire mesh, G.I. wire ties, insulation retaining studs, washers etc. All joints shall be staggered. The insulation shall be tightly secured to the exterior surface of the flue by impaling on the studs and fixing in place by means of 63mm round or square metal plated speed washers. 20 gauge galvanized wire netting shall be wrapped continuously over the entire exterior of insulation. The wire mesh shall be 25mm hexagonal pattern conforming to IS:1566. All joints in the mesh shall be tapped a minimum of 150 mm tied by 16 gauge soft annealed wire at 300 mm spacings. Lacing at joints shall not be used. The Contractor before application of insulation, shall take prior approval of actual fixing arrangement from the Engineer.

The insulation shall be able to sustain structural vibrations and shall not settle under such conditions during erection, construction & operation. The insulation shall be suitably tied to prevent dislocation under adverse conditions.

The cladding of stainless steel sheet over the insulation shall be well secured using pins, fasteners etc.

d) **Vermiculite Concrete**

Vermiculite concrete shall be made by mixing exfoliated vermiculite, portland cement and water. It shall be of Grade-B, having a density of 210 Kg./Cu.M. The vermiculite aggregate size shall be maximum 6 mm. The mix shall be 1 cement and 8 vermiculite by volume.

3.6.0 **Acid-Proof/Chemical Resistant Protection to Roof Slab**

Acid-Proof/Chemical Resistant tiles bedded on acid proof/chemical resistant mortar shall be provided for the protection of roof slab. The intervening

space between the tiles shall also be filled up by chemical resistant/acid-proof epoxy mortar grouts. The mortar shall be used immediately after mixing.

Tiles shall be made of clay, feldsper or quartz and vitrified at a high temperature in ceramic kilns. These should be unglazed, free from deleterious materials and should conform to IS:4457. Iron oxide in the raw materials used, shall not exceed 2 percent. They should show a fine grained, dense and homogenous fracture when broken. They shall be sound, true to shape, flat and free from flaws and other manufacturing defects. Dimensions of the tiles shall be 198.5 x 198.5 x 35 mm. Depth of the groove on the underside shall not be more than 3 mm. Compressive and tensile strengths of the tiles shall not be less than 70 N/Sq.mm and 3.5 N/Sq.mm respectively.

3.7.0 **Flue Acid Drains and Manholes**

Flue acid drainage system, where provided, will comprise of collection sumps, dilution manholes, conveying pipes including connection to main drainage system.

Stainless steel pipes, bends, collection sumps, fixing straps, bolts etc. conforming to the relevant Indian Standards (or in absence of which British Standard BS:3605) shall be used in work. Pipes should be cut and joined as per manufacturer's instructions so as to leave the surface clean and square to the axis of pipe.

Manhole should be constructed as per drawing. However, for general guidance it may be noted that pit of required dimensions should be excavated, lean concrete (1:2:4 mix) of required thickness to be laid, Acid-proof/Chemical resistant brick masonry in 1:4 acid resistant cement mortar of necessary thickness be built and both sides plastered by 12mm thick acid proof plaster (1:3 mix) having waterproof admixtures.

Manholes should be covered by reinforced concrete slab on which a heavy duty (HD) manhole cover with frame having diameter 560mm and total weight 255 Kg (140 Kg for manhole and 115 Kg for cover) is to be fixed. For additional safety another inner cover or other approved methods may be adopted. The manhole cover shall be distinctively coded to indicate the type of drainage involved.

Inside manholes necessary channels and benchings finished smooth by neat cement in cement concrete (1:2:4) and foot rungs made from 20mm round bars at 300mm centres and staggered should be provided. Rungs should project 100mm from wall face and be embedded 200mm inside cement concrete block made in that location of brick work. These foot rests shall be painted with coal tar in the projected portions and cement slurry in the embedded part. Joint of any pipe with brick work shall be rendered perfectly leak proof.

Pipes and fittings in the connection pipe to the main drainage system shall be vitrified clayware conforming to relevant IS and laid to the line and level indicated in the drawings.

3.8.0 **Roof Drainage**

3.8.1 **General**

Rainwater outlets and down comers to run along inner face of stack wall, shall be made of standard cast iron rainwater pipes conforming to IS:1230. The brackets used to hold the pipes alongside the walls shall be wrought iron clevis type, split ring type or of perforated strap iron as approved by the Engineer. Each vertical pipe shall hang freely on its bracket fixed just below the socket. Suitable spacer blocks are to be kept in between the pipe and wall surface for fixing the pipe. All bends and junctions shall be provided with water tight clean-outs.

3.8.2 Pipe Joints

All joints between pipes, pipes and fittings and manholes shall be gas-tight when above ground and water tight when under ground. Method of pipe cutting and jointing shall be as per instruction of the pipe and fittings manufacturer or as approved by the Engineer. However following guidelines may be followed in absence of any instruction available from the manufacturer.

Socket and Spigot pipes shall be joined by cast lead joints. Spigot of the following pipe should be centred in the socket of the preceding pipe by tightly caulking in sufficient turns of tarred gasket or hemp yarn to have unfilled half the depth of socket. After the gasket or hemp yarn has been caulked tightly, a jointing ring shall be placed round the barrel and tightened against the face of the socket to prevent air lock. Molten lead shall then be placed round the barrel and tightened against the face of the socket. Thereafter molten lead should be poured in to fill the remainder of the socket and caulked with suitable tools tight round the joint to make up for shrinkage of the molten metal on cooling and should be finished 3mm behind the socket face. If any joint is suspected to be damaged it has to be opened out & redone.
Joints in cast iron pipes with special jointing arrangements like "Tyton" joints etc. shall follow the instructions of the manufacturer.

4.0.0 **TESTING AND ACCEPTANCE CRITERIA**

4.1.0 **General**

The Contractor shall carry out all sampling and testing in accordance with the relevant IS Specifications and as supplemented herein, for the following items or any other item as may be required by the Engineer unless otherwise specified in this specification. The Contractor shall get the specimens tested in laboratory, approved by the Engineer and shall submit to him, the original test results in triplicate, within seven days after the completion of the test. Engineer may present himself while such tests are being carried out.

4.2.0 **Cement**

Representative samples shall be taken as per the relevant IS Specification from each consignment of Cement received from the Purchaser/Manufacturer/Supplier for carrying out the tests for fineness (by hand sieving), setting time, compressive strength and soundness tests, and the Contractor shall carry out the above tests as per relevant Indian Standard. If the cement is supplied by the Contractor the test shall be carried out by him. The Contractor shall carry out any or all the tests on aggregates as may be required by the Engineer, in accordance with IS:2386 Parts-I to VIII. The acceptance criteria of the samples tested shall be in accordance with the requirements of the relevant IS specifications.

4.3.0 **Water**

Sampling and testing of water being used for concrete works shall be carried out as per IS:3550, by the Contractor, at regular intervals and whenever directed by the Engineer. The final acceptance criterion in case of doubt shall be as per IS:3025.

4.4.0 **Concrete**

The Contractor shall take cubes for works test as per requirement laid down in IS:516 regularly from the day's pour. The number of test cubes to be taken shall be as per IS:456. The Engineer may also use his discretion in deciding the rate of cubes to be taken. The acceptance criteria is to meet the requirement of IS:456. If the cube test results indicate that some portions of the work is below the required strength, the Engineer may order demolition of that portion of work which is below strength and ask the Contractor to rebuild, provided a satisfactory method of load testing is not possible. Such testing or demolishing and rebuilding shall be carried out by the Contractor.

4.5.0 **Steel Flue**

All site and shop welded joints shall be inspected and tested in accordance with clause 4.00.00 of Technical specification for Fab. and Erection of structural steel work.

4.6.0 **Insulations**

The insulating materials shall be tested for its stipulated characteristics and properties in accordance with the latest editions of IS:3144 and IS:3346 and/or as directed by the Engineer.

5.0.0 **INFORMATION TO BE SUBMITTED**

5.1.0 **With Tender**

The following technical information are required with the tender:

a) Source and arrangement of processing of aggregates proposed to be adopted.

b) Type of plant and equipment proposed to be used.

c) Names of firms with which association is sought for to execute the special items of work e.g. flue expansion compensator, load bearing insulation blocks etc. in the contract.

d) Types of formwork proposed to be used. All details as per clause no. 3.03.06 to be submitted, if slip form method is proposed to be used.

e) Shop proposed for fabrication of steel (flue) liners. Detailed write-up on procedure of erection of complete liner system including details of equipment proposed for the same.

f) For insulating material tests to be offered for inspection & tests for which test certificates will be submitted. A drawing showing the details of fixing insulation on the flues at bearings, lateral restraints and exterior surface.

g) Proposal for lifting of men and material in constructing the chimney.

5.2.0 **After Award**

The following information and data including samples where necessary, shall be submitted by the Contractor, progressively during the execution of the Contract.

5.2.1 **Programme of Execution and requirement of Materials**

Within 30 days of the award of the Contract, the Contractor will submit a Master Programme for completion of the work giving monthwise requirement of materials, particularly mentioning in details the materials which are to be supplied by the Owner and for the procurement of which the help of the Owner is required as per the terms & conditions of the Contract. In case the Contractor proposes to take on hire any machinery or tools and plants from the Owner, the detailed phased out programme of such hire is also to be submitted.

The master programme may have to be reviewed and updated by the Contractor quarterly or at more frequent intervals as may be directed by the Engineer depending on the exegencies of the work.

Detailed day to day programme of every month is to be submitted by the Contractor before the commencement of the month.

5.2.2 **Samples**

Samples of all materials proposed to be used shall be submitted as directed by the Engineer, in sufficient quantities, for approval. All samples shall be submitted well in advance of starting work at site. Approved samples will be preserved by the Engineer for future reference. The approval of the Engineer

shall not, in any way, relieve the Contractor of his responsibility of supplying material of specified quality.

5.2.3 **Design Mix**

Design mix as per details of this specification giving proportions of ingredients, sources of aggregates and cement along with accompanying test results of trial mixes as per relevant IS Specifications shall be submitted to the Engineer, for his approval, before it can be used on the work.
Further, the mix design for concrete of shell to be validated from a third party agency of national repute, as agreed upon by the owner.

5.2.4 **Detail Drawings**

Following items shall be provided by the Contractor which are to be approved by the Owner and Consultant.

a) Detail drawings and designs of form work including scaffolding to be used. If slipform method of construction is adopted, then detail drawings showing all the arrangements for slipform technique including methods for reducing internal diameter and providing required slopes on outer diameter.

b) Detail drawings and bar bending schedules for concrete components.

c) Shop drawings for structural steel and metal work, including inserts etc. The Contractor shall submit his proposal for testing site and shop joints provided in steel members.

d) Detail drawings for templates and temporary supports for embedments.

e) Category wise requirements of MS, tor and structural steel including GI flats of various sizes for procurement.

f) Detailed drawings of steel flues indicating details of joints, supports and restraints including insulation blocks, and details of expansion compensator.

g) Detailed drawing of hoisting arrangement for men and material satisfying statutory regulations laid down for safety purpose.

5.2.5 **Reports**

Following Test Reports shall be furnished by the Contractor :

a) Mill Test Report for cement and reinforcing steel if the materials are supplied by the Contractor.

b) Inspection Report of bought out items.

c) Inspection Report of formwork and reinforcement, insulations etc.

d) Reports of tests of various material and concrete.

e) Radiographic tests on welded joints in steel flues.

d) Any other data or report or test result required by the relevant IS Specifications and if required by the Engineer for satisfactory quality control of the workmanship.

2X660 MW Ennore SEZ SUPERCRITICAL TPS Approved vendor list against the clarification Sno :121			
Sl. No.	**Package Name**	**Vendor Name**	**Remarks**
ELECTRICAL PACKAGES			
1	ABOVE GROUND EARTHING MATERIALS	INDIA ELECTRICALS SYNDICATE	Submit cedentials
		PREMIER POWER PRODUCTS (CAL) PVT. LTD.	Approved
		RATAN PROJECTS & ENGINEERING CO. PVT.LTD.	Approved
		Associated Power Structures Pvt. Ltd.	Submit cedentials
		PASSIVE INFRA PROJECTS PVT. LTD.	Submit cedentials
		INDUSTRIAL PERFORATION (I) PVT.LTD.	Approved
		PATNY SYSTEMS (P) LTD	Submit cedentials
		RUKMANI ELECTRICAL & COMPONENTS PVT LTD	Approved
		UNITECH FABRICATORS and ENGINEERS PVT LTD	Approved
		RABI ENGINEERING WORKS PVT. LTD.	Approved
		JAMNA METAL COMPANY	Approved
2	CABLE TERM.& JOINT KITS	HARI CONSOLIDATED PVT.LTD.,NEW DELHI	Submit cedentials

		3M Electro and Communication India P.Ltd	Approved
		RAYCHEM RPG PRIVATE LIMITED	Approved
		YAMUNA POWER and INFRASTRUCTURE LTD	Approved
3	CABLE TRAY SUPPORT SYSTEM - BOLTABLE	PREMIER POWER PRODUCTS (CAL) PVT. LTD.	Approved
		STEELITE ENGINEERING LTD.	Submit cedentials
		INDUSTRIAL PERFORATION (I) PVT.LTD.	Approved
		RATANS PROJECTS AND ENGINEERING CO. PVT. LTD.	Submit cedentials
		AM-TECH ENGG.SERVICES	Approved
4	CABLE TRAYS & ACC.	RUKMANI ELECTRICAL & COMPONENTS PVT LTD	Approved
		EROS METAL WORKS PVT. LTD	Submit cedentials
		RABI ENGINEERING WORKS PVT. LTD.	Approved
		PATNY SYSTEMS (P) LTD	Submit cedentials
		PREMIER POWER PRODUCTS (CAL) PVT. LTD.	Approved
		UNITECH FABRICATORS and ENGINEERS PVT LTD	Approved
		PASSIVE INFRA PROJECTS PVT. LTD.	Submit cedentials

		RATAN PROJECTS & ENGINEERING CO. PVT.LTD.	Submit cedentials
		INDIANA GRATINGS PVT. LTD.	Submit cedentials
		Maheshwari Electrical Mfrs. Pvt. Ltd.,	Submit cedentials
		INDUSTRIAL PERFORATION (I) PVT.LTD.	Approved
		INDIA ELECTRICALS SYNDICATE	Submit cedentials
		JAMNA METAL COMPANY	Approved
		PENTAX FERRO INCORPORATE	Submit cedentials
		PARMAR METALS PVT.LTD.	Submit cedentials
5	DC BATTERY CHARGER	DUBAS ENGG PVT LTD	Approved
		HBL POWER SYSTEMS LTD	Approved
		STATCON POWER CONTROLS LTD	Approved
		CHLORIDE POWER SYSTEMS & SOLUTIONS LIMITED	Approved
		JEMA ENERGY	Submit cedentials
		MASS-TECH CONTROLS PVT.LTD.	Submit cedentials
		CHHABI ELECTRICALS PVT.LTD.	Approved

		AMARA RAJA POWER SYSTEMS LIMITED	Approved
6	DC Ni Cd BATTERIES	AMCO SAFT INDIA LTD	Approved
		HOPPECKE BATTERIEN GMBH & CO.KG,	Approved
		AMARA RAJA POWER SYSTEMS LIMITED	Approved
		EXIDE INDUSTRIES LTD	Approved
		HBL POWER SYSTEMS LTD	Approved
7	ELECTRIC LAB EQUIPMENT	PCI LIMITED	Approved
		SCIENTIFIC MES-TECHNIK PVT.LTD.	Approved
		THE MOTWANE MANUFACTURING CO.PVT.LTD.	Approved
		Applied Techno Products Pvt. Ltd.,	Approved
		TECHNOLOGY PRODUCTS	Approved
		TTL Technologies Pvt. Ltd.	Approved
		THE TINSLEY GROUP LTD.	Approved
		HIOKI E.E. CORPORATION	Approved
		Pinkcity Electronics Pvt. Ltd.	Submit cedentials

		JOST's ENGG. CO. LTD.	Approved
8	FIRE SEALING SYSTEM	LLOYD INSULATIONS (INDIA) LIMITED	Approved
		MULTI KILFIRE PVT LTD	Approved
		VIJAY SYSTEMS ENGINEERS PVT LTD	Approved
		SIGNUM FIRE PROTECTION (INDIA) PVT LTD	Submit cedentials
		HILTI INDIA PRIVATE LIMITED	Approved
9	GENERATOR CIRCUIT BREAKER	ALSTOM GRID SAS	Approved
		ABB SWITZERLAND LTD.,	Approved
10	HT XPLE CABLES	POLYCAB WIRES PVT. LTD.	Approved
		RAVIN CABLES LIMITED	Approved
		TORRENT CABLES LTD.	Approved
		PARAMOUNT COMMUNICATIONS LTD.	Approved
		KEC INTERNATIONAL LIMITED	Approved
		KEI INDUSTRIES LTD.	Approved
		GEMSCAB INDUSTRIES LTD.	Submit cedentials

		SRIRAM CABLES PVT. LTD.	Submit cedentials
		CRYSTAL CABLE INDUSTRIES LTD.	Submit cedentials
		UNIVERSAL CABLES LTD.	Approved
		Havells India Limited	Approved
		Diamond Power Infrastructure Ltd	Not approved
		NICCO CORPORATION LTD.	Submit cedentials
		KRISHNA ELECTRICAL INDUSTRIES LTD.	Not approved
		APAR INDUSTRIES LIMITED,	Approved
		CABLE CORPORATION OF INDIA LTD.	Approved
11	LT PVC CONTROL CABLE	PARAMOUNT COMMUNICATIONS LTD.	Approved
		UNIVERSAL CABLES LTD.	Approved
		CRYSTAL CABLE INDUSTRIES LTD.	Submit cedentials
		KEC INTERNATIONAL LIMITED	Approved
		TORRENT CABLES LTD.	Approved
		Incom Cables (P) Ltd.,	Submit cedentials

Advance Cable Technologies (P) Ltd.	Submit cedentials
GOVIND CABLE INDUSTRIES	Not approved
KEI INDUSTRIES LTD.	Approved
Scot Innovation Wires and Cables Pvt. Ltd.	Submit cedentials
RAVIN CABLES LIMITED	Approved
ELKAY TELELINKS LTD.	Approved
Sam Cables & Conductors (P) Ltd.,	Submit cedentials
DELTON CABLES LTD.	Approved
GEMSCAB INDUSTRIES LTD.	Submit cedentials
SPECIAL CABLES PVT. LTD.	Submit cedentials
NICCO CORPORATION LTD.	Submit cedentials
POLYCAB WIRES PVT. LTD.	Approved
Havells India Limited	Approved
CMI LTD.	Submit cedentials
APAR INDUSTRIES LIMITED,	Approved

		KRISHNA ELECTRICAL INDUSTRIES LTD.	Not approved
		Diamond Power Infrastructure Ltd	Not approved
		CORDS CABLE INDUSTRIES LTD.	Approved
		SPM POWER & TELECOM PVT. LTD,	Submit cedentials
		GUPTA POWER INFRASTRUCTURE LIMITED,	Approved
		THERMO CABLES LTD.	Approved
		SUYOG ELECTRICALS LTD.	Approved
		MANSFIELD CABLES COMPANY LTD.	Approved
12	LT XLPE FIRE SURVIVAL CABLES	CORDS CABLE INDUSTRIES LTD.	Approved
		APAR INDUSTRIES LIMITED,	Approved
		KEI INDUSTRIES LTD.	Approved
		POLYCAB WIRES PVT. LTD.	Approved
13	LT XLPE POWER CABLE	KEI INDUSTRIES LTD.	Approved
		POLYCAB WIRES PVT. LTD.	Approved
		HAVELLS INDIA LTD.	Approved

KRISHNA ELECTRICAL INDUSTRIES LTD.	Not approved
KEC INTERNATIONAL LIMITED	Approved
Scot Innovation Wires and Cables Pvt. Ltd.	Submit cedentials
PARAMOUNT COMMUNICATIONS LTD.	Approved
SPECIAL CABLES PVT. LTD.	Submit cedentials
RAVIN CABLES LIMITED	Approved
APAR INDUSTRIES LIMITED,	Approved
MANSFIELD CABLES COMPANY LTD.	Approved
CORDS CABLE INDUSTRIES LTD.	Approved
TORRENT CABLES LTD.	Approved
Diamond Power Infrastructure Ltd	Not approved
SRIRAM CABLES PVT. LTD.	Submit cedentials
SUYOG ELECTRICALS LTD.	Approved
THERMO CABLES LTD.	Approved
GEMSCAB INDUSTRIES LTD.	Submit cedentials

		GUPTA POWER INFRASTRUCTURE LIMITED,	Approved
		Govind Cable Industries,	Submit cedentials
		CRYSTAL CABLE INDUSTRIES LTD.	Submit cedentials
14	MS ROD FOR BELOW GROUND EARTHING	STEEL AUTHORITY OF INDIA LTD.	Approved
		RASHTRIYA ISPAT NIGAM LIMITED	Approved
15	NEUTRAL GROUNDING RESISTOR	S.R.NARKHEDE ENGG.PVT.LTD.	Submit cedentials
		RSI SWITCHGEAR PVT. LTD.	Approved
		LACHHMAN ELECTRONICS	Approved
		RESITECH ELECTRICALS PVT.LTD.	Approved
		AMP CONTROL EQUIPMENTS PVT. LTD.	Approved
16	OIL FILLED SERVICE TRANSFORMER	ESENNAR TRANSFORMERS (P) LTD.	Submit cedentials
		DANISH PRIVATE LIMITED	Submit cedentials
		SOUTHERN POWER EQUIPMENT COMPANY PVT. LTD.	Submit cedentials
		Tesla Transformers Ltd.,	Approved
		KANOHAR ELECTRICALS LTD.	Submit cedentials

		EMCO LIMITED	Approved
		MARSONS LIMITED	Submit cedentials
		UNIVERSAL POWER TRANSFORMERS PVT. LTD.,	Submit cedentials
		SCHNEIDER ELECTRIC INFRASTRUCTURE LIMITED	Approved
		TECHNICAL ASSOCIATES LTD.,	Submit cedentials
		KRYFS Power Components Ltd. ,	Submit cedentials
		VOLTAMP TRANSFORMERS LTD.	Approved
		TRANSFORMERS and RECTIFIERS (INDIA) LTD.	Approved
17	PA SYSTEM	Hi-Tech audio Systems Pvt. Ltd	Approved
		KARTHIK ENGRS. and CONSULTANTS PVT. LTD.	Approved
		CHASHMITA ENGINEERS PVT. LTD.	Approved
		BYTE COMMUNICATIONS PVT.LTD.	Submit cedentials
		INDUSTRONIC INDUSTRIE-ELECTRONIC GmbH & CO KG	Submit cedentials
		POWER SYSTEMS	Approved
18	SCREENED CONTROL CABLES	THERMO CABLES LTD.	Approved

	CABLES	PARAMOUNT COMMUNICATIONS LTD.	Approved
		KEI INDUSTRIES LTD.	Approved
		ELKAY TELELINKS LTD.	Approved
		POLYCAB WIRES PVT. LTD.	Approved
		MANSFIELD CABLES COMPANY LTD.	Approved
		NICCO CORPORATION LTD.	Approved
		SUYOG ELECTRICALS LTD.	Approved
		DELTON CABLES LTD.	Approved
		CMI LTD.	Submit cedentials
		SPECIAL CABLES PVT. LTD.	Submit cedentials
		TC COMMUNICATION PVT. LTD.	Submit cedentials
		CORDS CABLE INDUSTRIES LTD.	Approved
19	STATION LIGHTING SYSTEM	BAJAJ ELECTRICALS LTD.	Approved
		M/s.Crompton	Approved
			Approved

		SPACEAGE SWITCHGEARS LTD.	Submit cedentials
		TECHNO ELECTRIC and ENGG. CO. LTD.	Submit cedentials
		MIKA ENGINEERS,	Not approved
		AVAIDS TECHNOVATORS PVT. LTD.	Approved
20	TREFOIL CLAMPS	SUMIP COMPOSITES PVT.LTD.	Submit cedentials
		ELECTROMAC INDUSTRIES	Submit cedentials
		AJMERA INDUSTRIAL & ENGINEERING WORKS	Approved
		MOULDED FIBREGLASS PRODUCTS	Approved

QUALIFICATION CRITERIA (revised):-

A) **Technical Qualification Criteria**: Bidder should have executed the following in India in the last seven years preceding the latest due date of bid submission.

1 Bidder should have executed the following in Power/Industrial projects

1.1 One (1) civil or civil and structural work of value not less than Rs **1000 crores**

(OR)

1.2 Two (2) civil or civil and structural works each of value not less than Rs **625 crores**

(OR)

1.3 Three (3) civil or civil and structural works each of value not less than Rs **500 crores**

Note for 1.1 to 1.3:

- If the bidder has executed Supply separately & Services separately in two different work orders but for the same work (system) in a project, can be combined and considered as "one" work for the purpose of evaluating the above.
- Loading will be considered against clause No 1 above for value of FREE SUPPLY items **Cement & Steel** from customer in line with PVC clause in Volume-1A, Part-II, Chapter-1, Slno 3.1.3 of this Tender Specification for cement and steel separately as applicable.
- The value of work completed will be updated as per PVC formula of GCC with indices for All India average consumer price index for Industrial workers with base month as the date of completion of execution and indexed up to two months prior to the bid opening month.
- Refer **below** the example for Calculation for value updation for the executed civil works.

AND

2 The bidder should have executed the following in the last seven years preceding the latest due date of bid submission.

2.1 Ground improvement work by installing at least **4,36,800 RM** of stone columns/sand compaction piles within a period of eight months in any one contract or cumulative of two concurrent contracts in any projects.

2.2 Cast in situ RCC piles of at least **1,10,000 RM** in any one contract or cumulative of two concurrent contracts. Also, the bidder should have installed at least .**6,400 RM** of **bored cast in situ piles** and at least **6,200 Rm** of **driven cast in situ piles** in any one month, in any projects through one contract or cumulative of two concurrent contracts.

2.3 Concreting of at least **72,000 CUM** of RCC within a period of twelve consecutive months in

one or cumulative of two concurrent contracts in Power/Industrial projects. Bidder should also have completed and handed over a STG Deck for one unit of **400MW** rating or more for mechanical erection in a Thermal Power Plant.

2.4 Structural steel fabrication and erection of at least **10,400 MT** each within a period of twelve consecutive months in one or cumulative of two concurrent contracts in Power/Industrial projects. Bidder should also have completed fabrication and erection of Mill Bunker structure in one unit of **400MW** rating or more in a Thermal Power Plant.

2.5 At least one RCC Chimney with steel flue for a unit of 400MW rating or more in a Thermal Power Plant.

2.6 The bidder should have Designed, Constructed and commissioned at least one number of natural draft cooling tower (NDCT) for a unit of rating 400MW or more in a Thermal power plant on EPC basis.

Note-1: The term **"Executed"** in PQR 1&2 above means: the bidder should have achieved the criteria specified even if the contract has not been completed or closed.

Note-2: The word **"Concurrent"** on the above PQR means "The quantum of work carried out in two contracts during the same period."

Note 3: Bidders not satisfying the conditions above can have consortium for the area of work as mentioned below.

Definition:-
Standalone bidder:-The bidder who fulfils all the conditions stipulated above on their own without any consortium partner.

Prime bidder: The Prime Bidder shall be one, who qualifies against Clause-A, Point- 1 with / without consortium Partner(s). In case the Bidder claims qualification with Consortium, his share shall not be less than 65% of the qualifying value under Clause-A, Point- 1.1, 1.2 and 1.3 as applicable for his respective area of work.

And

The Bidder shall also qualify under clause 2.2, 2.3 and 2.4, on his own, without any consortium Partners

Consortium partner:- Consortium partner is the one who qualifies against any or all conditions specified under Clause 2.1, 2.5 and 2.6.

B-1. CONSORTIUM CONDITIONS

In case of consortium bidding, following shall be complied with Relevant document shall be submitted in these regards.

1.0	Number of partners including prime bidder shall not be more than 4 (four).
2.0	Prime bidder shall be the bidder who has a major share of work. Prime bidder should satisfy the conditions stipulated in clause-A, Point -1 with/without consortium partner and under clause 2.2, 2.3, and 2.4 on their own. In case the Bidder claims qualification with consortium, his share shall not be less than 65% of the qualifying value under clause-A, Point- 1.1, 1.2 & 1.3 as applicable for his respective area of work. However in case of consortium, the value of the consortium partner(s) should not exceed 35% of the value in Clause-A, Point- 1.1, 1.2 & 1.3 as applicable in their respective area of work. Prime Bidder can have consortium partner(s) for conditions stipulated in Clause 2.1, 2.5 & 2.6 subject to a maximum of four agencies including the prime bidder in a consortium bid.
3.0	Prime bidder together with all his partner(s) in a consortium should fulfill all the conditions as specified in the PQR. Prime bidder and consortium partner(s) shall enter into consortium agreement as per the form F22 (revised) in TCC.
4.0	In case consortium bidding is allowed as per pre-qualifying requirement, then the prime bidder and consortium partner(s) shall enter into consortium agreement. Validity period of consortium agreement shall be 6 months from the date of bid submission plus the duration of works indicated in the tender / contract along with the extended period if any. '**Standalone'** bidder cannot be a '**prime bidder'** or a '**consortium partner'** in consortium bidding. Prime bidder shall not be a consortium partner to other prime bidder(s). A prime bidder shall not submit more than one consortium bid. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non-compliance, consortium bids of such prime bidders will be rejected.
5.0	Short listed bidders (Standalone/ Prime bidder with his consortium partners) shall be considered for the tender subjected to the approval by customer
6.0	Prime bidder shall be responsible for the overall execution of work.
7.0	Performance as per Clause no 9 of NIT shall be evaluated for prime bidder and consortium partner for their respective scope of work and each agency including the prime bidder in a consortium should qualify individually against NIT clause no: 9 on performance evaluation criteria so that the consortium is qualified .
8.0	Incase prime bidder fails in performance/withdraws, the whole contract shall be considered cancelled and short closed and the balance work will be executed on risk and cost of the bidder (prime bidder +consortium partner).However, BHEL reserves its right to cancel the entire contract or only the portion under the direct execution scope of Prime bidder whose performance is poor and proceed with the consortium partners for their respective areas of work, where the performance of consortium partners is satisfactory to BHEL. Commercial implications, if any, on account of such exercise, arising out of withdrawal of total work or withdrawal of prime bidders' portion of work alone, is to the account of the prime bidder who has failed to perform. This risk and cost will also include the difference in cost between the contracted rates for consortium partner(s) scope and the agreement between the prime bidder and consortium partner against documentary evidence subject to approval of BHEL.

9.0	In case of consortium partner(s) fails in performance /backs out, another consortium partner meeting the PQR has to be engaged by the prime bidder and if not the respective work will be withdrawn and executed on risk and cost of the prime bidder without any time loss.
10.0	The consortium partner(s) shall submit additional EMD to BHEL as under along with the offer in addition to the EMD to be furnished by the Prime bidder 1. For ground improvement **Rs 2.0 Crore**. **2.** For RCC Chimney Rs **1.6 Crore.** **3.** For NDCT **Rs 4.30 Crore.** The prime bidder/standalone bidder shall submit EMD to BHEL for **Rs 20 Crores** along with the offer. The bidders have one time EMD with PSSR also have to submit this.
11.0	After successful execution of two similar works in consortium with the same consortium partner under direct orders from BHEL, the prime bidder shall be eligible for becoming a standalone bidder for similar works, subject to certification from end user/purchaser about the active involvement of the prime bidder for satisfactory execution of works.
12.0	Credentials of works executed by prime bidder and consortium partner(s) should be submitted separately for their respective area of work in the format enclosed.
13.0	Consortium partner's qualifying work should be similar to the requirement in the current tender. Scope of supply of T&P, completion certificate and work order should reflect this else it may lead to disqualification
14.0	BHEL reserves the right to decide on successful bidder based on reverse auction process

Note: The work 'Executed" in the above QR means; the bidder should have achieved the criteria specified even if the contract has not been completed or closed.

1.1 **C – FINANCIAL REQUIREMENTS**

C-1	TURNOVER Prime Bidder/standalone bidder must have achieved an average annual financial turnover (Audited) of **Rs 375 Crore** or more over last three Financial Years (FY) i.e 2011-2012,2012-2013,2013-2014
C-2	NETWORTH (only in case of Companies) Net worth of the Prime Bidder/ standalone bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive
C-3	PROFIT Prime Bidder / standalone bidder must have earned net profit after tax as at the financial year ending on 31.03.2014 and the prime bidder/ standalone should have earned net profit after tax for any one of the previous financial years 2012-2013 or 2011-2012. The facts are to be established by the audited balance sheet of the prime bidder/ standalone bidder.
C-4	The prime bidder/ standalone bidder shall not be under CDR or BIFR as on date of NIT. Prime Bidder should submit a certificate from their Principal Banker / statutory auditor

	declaring that the prime bidder is not under CDR (Corporate Debt Restructuring) OR BIFR (Bureau of Industrial and Financial Reconstruction) as on date of NIT. In addition the prime bidder/ standalone bidder shall submit a 'certificate of Solvency' for a value not less than **Rs100 Crore** from the Principal Banker as on date, not earlier than the date of NIT. **Non submission of such certificate shall entail rejection of the bid.**

Example Calculation for value updation:

Value of work with completion month mentioned as June 2011is say Rs.75,00,000.00
Tender opening date is say Feb 01, 2014
Consumer Price Index for labour as published in www.labourbureau.nic.in is as follows:
Nc = For the month of June 2011(work completed month) is 189.
Nt = For the month of Dec 2013 (two months prior to tender opening month) is 239.

$$\text{Updated value} = \text{Executed value (Ev)} + \left(\text{Ev} \times 0.40 \times \frac{(Nt - Nc)}{Nc}\right)$$

$$= 7500000 + \left(7500000 \times 0.40 \times \frac{(239 - 189)}{189}\right)$$

$$= 7500000 + (7500000 \times .4 \times 50/189)$$

$$= \textbf{Rs. 8293650.00}$$

Note: Refer below the methodology for loading against clause No 1 above for value of FREE SUPPLY items of Cement & Steel.

Methodology of loading for steel and cement against Note to PQR Clause no 1, with model calculation

Sl.No.	Qualifying Work, as claimed by Bidder, against PQR Cl.no. 1				Value of executed work against Clause no.1 as considered for current tender SCT-1575 after loading in line with note to clause no.1 of PQR and cl.no. Sno 3.1.3 of TCC	
	Executed Value of work as per order	***Scope of supply of cement for construction***	***Scope of supply of Steel for construction***	***Remarks based on Rs.100/= as the value of work executed with scope of supply of steel and cement in contractor's scope related to current tender which considers 20% of executed work for PVC towards cement and 25% of executed work towards PVC for steel***	**Loading factor in line with Clause no.Sno 3.1.3 of PVC clause in TCC**	**Value of executed work, after loading, for supply of steel and / or cement, on the value of work executed by Bidder - Refer note below.** **This is how loading , cited in note to clause no.1 of PQR, will be applied to arrive at the value that will be considered for qualification against clause no. 1 of PQR in SCT - 1575**
	100	Customer	Customer	Corresponds to 55% of cited clause	1/.55	181.8181818
	100	Bidder	Customer	Corresponds to 75% of cited clause	1/.75	133.3333333
	100	Customer	Bidder	Corresponds to 80% of cited clause	1/.80	125
	100	Bidder	Bidder	Corresponds to 100% of cited clause	1/1	100
	Note :	**1.As per Clause no. Sno 3.1.3. of current Tender SCT-1575, 20% of executed value is towards PVC for cement and 25% of executed value is towards PVC for Steel with supply of both, steel and cement, in the scope of Bidder. This means that when the value of work executed is Rs.100 with both cement & steel under bidder scope, it will correspond to a value of Rs.80 without supply of cement but with steel as free issue, Rs.75 without steel but with cement as free issue and Rs 55 without steel and cement, Rs 100 with both steel and cement as free issue.** **2.Complete Work order/agreement including the BOQ and Work execution/completion certificate to be submitted along with your offer for your qualifying experience claim against PQR-1 &2.**				

TENDER SPECIFICATION

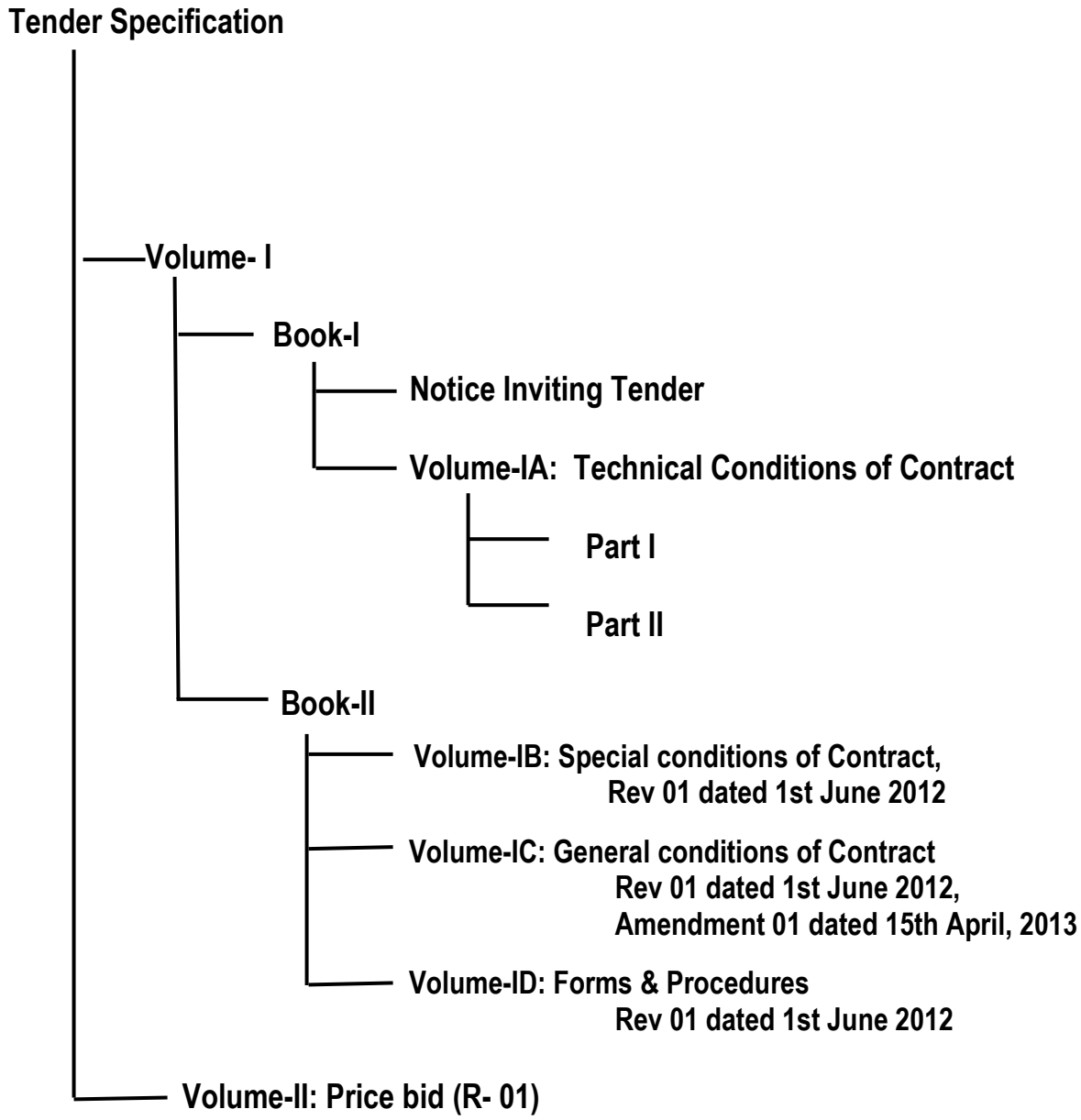
BHEL: PSSR: SCT: 1575

FOR

CONSTRUCTION OF CIVIL WORKS FOR 2x660MW SETS AT ENNORE SEZ THERMAL POWER PROJECT AT ASH DYKE OF NORTH CHENNAI TPS, CHENNAI, TAMIL NADU

VOLUME-2 PRICE BID
Revision -01

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.


Tender Specification
Volume- I
Book-I
Notice Inviting Tender
Volume-IA: Technical Conditions of Contract
Part I
Part II
Book-II
Volume-IB: Special conditions of Contract,
Rev 01 dated 1st June 2012
Volume-IC: General conditions of Contract
Rev 01 dated 1st June 2012,
Amendment 01 dated 15th April, 2013
Volume-ID: Forms & Procedures
Rev 01 dated 1st June 2012
Volume-II: Price bid (R- 01)

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35

Tender Specification No. BHEL: PSSR: SCT: 1575

For

Construction of Civil, Structural and Architectural works including Piling, Ground improvement etc. in entire area, construction of RCC Chimney (twin flue 275M) & Natural Draft Cooling Tower (NDCT) for Unit-1&2 of 2 X 660 MW sets at Ennore SEZ Super Thermal Power Project at Ash dyke of North Chennai TPS, Chennai, TamilNadu

One set of Tender documents consisting of

1) Techno Commercial Bid	- 2 copies
2) PRICE BID (RATE SCHEDULE)-Volume-2	- 2 copies

Book Sl no …….

Issued to
M/s

Refer NIT for Last date of submission

Please note this tender document is not transferable

For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

GENERAL MANAGER / HR&CONTRACTS

Place: Chennai -35
Date:

PREAMBLE TO THE SCHEDULE OF QTS. (SOQ)

1) Details of the items in this Schedule shall be read in conjunction with the corresponding BHEL's Customer specifications and other documents and shall have precedence over any contrary statement mentioned anywhere in this document.

2) The work shall be carried out as per construction drawings (which will issued progressively during the execution), specifications, the description of the items in this schedule and/or Engineer's instructions., The layout, sizes and details of the building, structures and foundations may vary at a large extent during actual construction.

3) Items of work provided in this schedule but not covered in the specifications shall be executed strictly as per instructions of the Engineer.

4) Unless specifically mentioned otherwise in the contract, the bidder shall quote his rates for the finished items and shall provide for the complete cost towards fuel, tools, tackle, equipment, constructional plant , temporary works, labour, materials, levies , taxes , transport, layout, repairs, rectification, maintenance till handing over, supervision, shops, establishments, services , temporary roads, revenue expenses, contingencies, overheads, profits and all incidental items not specifically mentioned but reasonably implied and necessary to complete the works according to the contract.

5) The rate quoted shall be inclusive of cleaning the site of any vegetations, dressing and leveling etc., required for commencement of site activities. No separate payment will be made towards the same.

6) The rate shall also be inclusive of carrying out survey of site to establish levels and coordinates at suitable intervals, form existing grid levels and coordinates furnished by the owner, establish bench marks, setting out the location and levels of the proposed structures, constructions and making references , pillars and other identification marks etc. No separate payment will be made towards the same.

7) Engineers decision shall be final and binding on the contractors regarding clarification of items in this schedule with respect to the other section of the contract.

8) Incase of any discrepancy between item description, relevant drawing and/or specification clarification shall be sought at tender stage itself. Otherwise it shall be assumed that the bidder has quoted for the more stringent requirement.

9) Refer Relevant Clause in NIT for order of precedence.

10) **Refer clause 1.4 in GCC for price discrepancy**.

PRICE BID FOR Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP			
		SUMMARY	**Revision 01**
Package	**Package Description**	**Amount (Rs)**	
		In Fig	**In Words**
1	Ground Improvement		
2	Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading		
3	275m Tall RCC Twin Flue Steel Chimney		
4	Construction of 2 No's of cooling Tower (NDCT) on EPC basis		
	TOTAL		
Note			
Refer clause 1.4 in the GCC for price discrepancy			

SIGNATURE OF BIDDER

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package-1 - Ground Improvement work							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**Total Quantity**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
3000	**Ground Improvement**						
3001	Mobilisation of ground improvement rigs and accessories capable of installing driven cast-in-situ compaction piles (applicable for ST No.3002) in all types of strata/ash etc. to the project site and demobilisation of the same after completion of works etc all complete.	Each	10				
3002	Providing and installing 550 mm diameter and 14 m deep driven cast-in-situ compaction pile by driving a suitable MS casing pipe (removable) with detachable M.S.shoe (flat/conical) at the bottom and filling inside the casing pipe in layers of 800mm using 1 sand: 2 stone aggregates and each layer be well compacted by dynamic compaction method including all materials, equipments etc all complete as per specification, drawing and as directed by the engineer-in-charge. Prior to compaction of fill at each layer, lift the casing for about 800mm from bottom and then the backfill shall be thoroughly compacted. This procedure shall be repeated for every layer till the ground level is reached for ground improvement of pond ash/soil deposit at desired location.	Each	44093				
3003	Mobilisation of ground improvement rigs and accessories capable of installing stone columns by vibro-displacement method (dry method) using vibro float/vibro cat/any other suitable means (applicable for ST No.3004) in all types of strata/ash etc to the project site and demobilisation of the same after completion of works etc all complete.	Each	10				
3004	Providing and installing 550 mm diameter and 14 m deep stone column by vibro-displacement method (dry method) using vibro float/vibro cat/any other suitable means and filling in layers of 800 mm using 1 sand : 2 stone aggregates and each layer be well compacted by vibro compaction method including all materials, equpiments etc complete as per specification, drawing and as directed by the engineer-in-charge. This procedure shall be repeated for each layer of fill till the ground level is reached for ground improvement of pond ash/soil deposit at desired location.	Each	36988				
3005	Rebate on ST No 3002 for not providing 1 sand : 2 stone aggregates to a depth of 2m below ground level.	Cum	20720				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package-1 - Ground Improvement work							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**Total Quantity**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
3006	Rebate on ST No 3004 for not providing 1 sand : 2 stone aggregates to a depth of 2m below ground level.	Cum	17725				
3007	Extra over ST. No. 3002 for driven cast-in-situ compaction pile of length beyond the specified depth of 14m.	RM	42077				
3008	Extra over ST. No. 3004 for stone column with vibro-displacement method (dry method) of length beyond the specified depth of 14m.	RM	35788				
3009	Rebate on ST.No.3002 for driven cast-in-situ compaction pile of length less than the specified depth of 14m.	RM	42077				
3010	Rebate on ST No.3004 for stone column with vibro-displacement method (dry method) of length less than the specified depth of 14m.	RM	35788				
	TOTAL						

SIGNATURE OF BIDDER

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
	100 EARTH WORK						
	Earth work In excavation, backfilling and disposal including necessary men/women, materials, equipment, loading, transportation, unloading, dewatering etc as per specification, drawing and as directed by engineer- in-charge for the following.						
101	Earth work in excavation in all types of soil/ash which can be excavated by any means including setting out, levelling, dewatering (but excluding special type of dewatering viz. well point method), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 500 m, spreading/levelling of disposed materials etc all complete for following depths below ground level.						
a	Depth from ground level but not exceeding 2 m	CUM	**396322**				
b	Depth exceeding 2 m but not exceeding 4 m	CUM	**243517**				
c	Depth exceeding 4 m but not exceeding 6 m	CUM	**58210**				
d	Depth exceeding 6 m but not exceeding 8 m	CUM	**11750**				
e	Depth exceeding 8 m but not exceeding 10 m	CUM	**5425**				
f	Depth exceeding 10 m but not exceeding 15 m	CUM	**848**				
102	Extra over ST No. 101 for dewatering of ground water by well point method as per IS 9759.	CUM	**35628**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
107	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with selected materials from compulsorily excavated soil/ash available within a lead upto 500m and compacted as specified including re-excavation of stacked earth, watering, ramming/compaction by manual/mechanical means, dressing etc all complete.for the following.						
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	CUM	**291466**				
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	CUM	**98886**				
108	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with soil/ash directly from excavation and compacted as specified including watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following.						
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	CUM	**59273**				
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	CUM	**18336**				
109	Extra over ST No. 101,107 & 108 for carriage of excavated earth/selected materials for every 1 km or part thereof beyond an initial lead of 500m.	CUM	**318774**				
110	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with approved borrowed soil (borrowed soil to be arranged by the bidder) and compacted as specified including supplying borrowed soil, royalty (if any), watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	CUM	**42218**				
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	CUM	**12587**				
111	Supplying and filling sand upto any depth under floors, around foundations, plinths etc. in layers not exceeding 250 mm thickness and compacted so as to achieve at least 80% relative density as per IS-2720 (Part-XIV) including spreading, watering, ramming/compaction by manual / mechanical means, dressing, royalty (if any) etc. all complete.	CUM	**7234**				
A112	Earthwork in excavation using Horizontal directional drilling (HDD) technique including equipments, machinery etc. all complete.	CUM	**510**				
A113	Providing and laying rubble soling with specified sizes of approved quality hard rock rubble or hand broken hard metal of sizes ranging from 100mm to 230mm, at all position and depths below or above finished ground floor level, below foundations, below flooring, and for providing hard standing etc in one or more layers each of approximately 230mm thickness, hand packing, filling in interstices with quarry spalls, grits and providing a layer of 50mm. thickness (consolidated) of moorum/equivalent locally available approved material over each layer of soling including watering, thoroughly compacting each layer with 10 tonne power roller with minimum 6 passes (or with vibrating plate of approved capacity at places not approachable by power roller) all as per the direction of the Engineer and as per specification.	CUM	**950**				
	200 CONCRETE WORKS						
	Providing and placing concrete work including cost of labour, materials and equipment for handling, transportation, batching, mixing, placing, vibrating and curing, (excluding cost of centering, shuttering and reinforcement) with mechanised equipments like batching plant, transit mixer, concrete pump etc. complete as per drawing, specifications and as per direction of engineer in charge for the following.						

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
201	Concrete of grade M7.5 (1 part cement, 4 part sand, 8 parts of 40 mm graded aggregate by volume) as filling course at any depth below finished floor level, under and around foundations/floors, mass fill etc.	CUM	**543**				
A201	Concrete of grade M15 (1 part cement, 2 part sand, 4 parts of 40 mm graded aggregate by volume) as filling course at any depth below finished floor level, under and around foundations/floors, mass fill etc.	CUM	**1619**				
202	Concrete of grade M10 (1 part cement, 3 part sand, 6 parts of 40 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	CUM	**21980**				
203	Concrete of grade M15 (1 part cement, 2 part sand, 4 parts of 40 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	CUM	**1264**				
204	Concrete under floors, paving, plinth protection, pipe encasing etc complete with 20 mm nominal size graded aggregate at any depth below finished floor level for the following grades.						
a	M15Grade	CUM	**8012**				
b	M20 Grade	CUM	**2878**				
A205	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262-2009 for reinforced concrete works with coarse sand and graded hard stone aggregate of 20mm nominal size in foundations/substructure, grade slab, paving, drains, under floors etc at any level below finished floor level, any shape, position or thickness etc complete including use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.						

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	M25 Grade	CUM	**21526**				
b	M30 Grade	CUM	**98716**				
c	M35 Grade	CUM	**1800**				
206	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262-2009 for reinforced concrete works with coarse sand and graded hard stone aggregate of 20mm nominal size in superstructure at any level above finished floor level, any shape, position or thickness etc complete including use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.						
a	M25 Grade	CUM	**1715**				
b	M30 Grade	CUM	**22469**				
207	Providing and laying Design Mix cement concrete confirming to IS:456 & IS 10262-2009 for reinforced concrete works of grade M-30 Grade in machine foundations for TG, Gas Turbine, ID/FD/PA fans, BFP, Coal mills at all elevations below/above finished floor level except TG deck and top decks supported over vibration isolation system including addition of suitable plasticizer conforming to IS 9103(latest) to achieve a slump more than 125mm in concrete as per manufacturer's recommendation with 20 mm nominal size graded aggregate in concrete all complete as per specification & drawing.	CUM	**6407**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A207	Providing and laying Design Mix cement concrete confirming to IS:456 & IS 10262-2009 for reinforced concrete works of grade M-35 Grade in machine foundations for TG, Gas Turbine, ID/FD/PA fans, BFP, Coal mills at all elevations below/above finished floor level except TG deck and top decks supported over vibration isolation system including addition of suitable plasticizer conforming to IS 9103(latest) to achieve a slump more than 125mm in concrete as per manufacturer's recommendation with 20 mm nominal size graded aggregate in concrete all complete as per specification & drawing.	CUM	**4694**				
208	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262-2009 of grades mentioned below for reinforced concrete works using graded aggregate in top decks of all machine foundations supported on vibration isolation system (excluding supply and installation of vibration system) at all levels including addition of suitable plastisizers conforming to IS9103 to achieve a slump more than 125 mm in concrete as per manufacturers recommendation, preperation of scheme for concreting, getting it approved by engineer, labour, materials, equipment, handling, batching, transporting, mixing, pumping, placing, leveling, vibrating, compacting, curing, testing, cleaning and rendering the exposed surface with cement sand mortar to give a smooth and even surface, maintaining and submitting records of concreting, petrographic examination and potential reactivity of aggregate etc. all complete as per specification, drawing and instructions of engineer, including UPV testing as directed by engineer in charge, rectification of the defects in concreting observed by ultra-sonic pulse velocity (UPV) testing by cement/epoxy grout etc, but excluding formwork, staging, reinforcement, embeddments and temperature control of concrete. Payment terms - a) After casting 75% ; b) After receipt of ultrasonic test report - 25%.						
a	M30 grade (with 20mm nominal size graded stone aggregate)	CUM	**2487**				
b	M35 grade (with 20mm nominal size graded stone aggregate)	CUM	**248**				
A208	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262-2009 of grades mentioned below for reinforced concrete works using graded aggregate in top decks of all machine foundations and top deck of TG foundation at all levels including addition of suitable plastisizers conforming to IS9103 to achieve a slump more than 125 mm in concrete as per manufacturers recommendation, preperation of scheme for concreting, getting it approved by engineer, labour, materials, equipment, handling, batching, transporting, mixing, pumping, placing, leveling, vibrating, compacting, curing, testing, cleaning and rendering the exposed surface with cement sand mortar to give a smooth and even surface, maintaining and submitting records of concreting, petrographic examination and potential reactivity of aggregate etc. all complete as per specification, drawing and instructions of engineer, including UPV testing as directed by engineer in charge, rectification of the defects in concreting observed by ultra-sonic pulse velocity (UPV) testing by cement/epoxy grout etc, but excluding formwork, staging, reinforcement, embeddments and temperature control of concrete. Payment terms - a) After casting 75% ; b) After receipt of ultrasonic test report - 25%.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	M30 grade (with 20mm nominal size graded stone aggregate)	CUM	**362**				
b	M35 grade (with 20mm nominal size graded stone aggregate)	CUM	**3861**				
A209	Extra over St. No. 205 to 208 for controlling of temperature of fresh concrete to less than 25 degree centigrade using ice, including all related arrangements for providing, storing and mixing of ice with water, cooling of aggregates etc. All complete as per specification, drawing and instruction of engineer in charge.	CUM	**7969**				
210	Extra over ST Nos. 205 to 207 for conducting UPV test for concrete at all levels including all equipments, making necessary arrangements, staging, submission of report etc. all complete as directed by engineer in charge and as per specification.	CUM	**13370**				
A211	Providing and encasing of structural steel member with concrete using nominial aggregate size of 12.5mm down. Encased member shall be wrapped with chicken wire mesh with proper lap etc. complete as per specification for the following grades.						
a	M20 Grade	CUM	**877**				
b	M25 Grade	CUM	**421**				
c	M30 grade	CUM	**1227**				
212	Screed concrete conforming to IS 456 with coarse sand and graded hard stone aggregate 12.5mm/6 mm nominal size on the roof at any level or thickness, drains etc complete as per following.						
a	1:2:4 (1 part cement, 2 part sand, 4 parts of aggregate by volume)	CUM	**50**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
b	1:1.5:3 (1 part cement, 1.5 part sand, 3 parts of aggregate by volume)	CUM	**50**				
A212	Screed concrete conforming to IS 456 with coarse sand and graded hard stone aggregate 12.5mm/6 mm nominal size on the roof at any level or thickness, drains etc complete as per following.						
a	M 20 grade	CUM	**1530**				
A213	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262-2009 for reinforced concrete works using graded aggregate for Concrete in precast works like roof slabs/trench covers, fins, lintels, chajas, beams, columns, wall panels, facias etc.at all levels in all kinds of work including formwork/moulds, curing, rendering the top exposed surface with cement sand mortar (1:3), handling, storing, transpoting, all leads, erection without damage, setting in position / pockets with mix 1:1:2 (1 cement : 1 coarse sand : 2 aggregate of 6 mm down graded stonechips) using non shrink admixture, filling the gaps between adjacent preacast units with M30 grade concrete or cement sand mortar (1:3) and including making of holes for bolts for fixing, welding etc.complete with graded aggregate (20/12.5/10 mm) and as per specification and drawing for following grades.(Cost of all material and cleaning the pocket by compressed air shall be in the scope of the contractor). Payment shall be made for the measurement of the volume of the precast works.						
a	M 25 grade	CUM	**1826**				
b	M 30 grade	CUM	**6426**				
A214	Providing and laying Design Mix cement concrete as per IS:456, IS 3370 & IS 10262-2009 for reinforced concrete works graded aggregate for Concrete in water retaining/conveying structures including addition of suitable plastisizer cum waterproofing cement additives confirming to IS 9103 latest to achieve a slump more than 125 mm in concrete as per manufacturers recommendation and conforming to limits of permeability as per IS 2545 and specification with 20 mm nominal size graded aggregate for following grades.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
b	M 30 grade	CUM	**6395**				
c	M 35 grade	CUM	**27720**				
215	Dismantling concrete work for all types of structures at all levels including stacking of servicable material to a lead of 500 m and disposal of unservicable material upto a lead of 2 km, cutting of reinforcement, labour, equipment, safety precautions etc all complete as per drawings, specification and instructions of engineer in charge.						
a	Plain cement concrete of all grades	CUM	**727**				
b	Reinforced cement concrete of all grades	CUM	**1254**				
216	Chipping of concrete in reinforced concrete work, cutting pockets, making openings at all levels and according to shapes, disposal of waste materials upto a lead of 2 km as directed by engineer including equipment, safety precautions, making good the broken surface etc all complete as per specification, drawing, instructions of engineer in charge but excluding cutting of reinforcement .	CUDM	**3106**				
217	Extra over and above St No 216 for cutting of reinforcement, all sizes and types including labour, equipment, return of cut reinforcement to store etc all complete as per specification, drawings and instructions of engineer in charge. Measurement shall be on the cross sectional area of reinforcement cut.	SQCM	**176**				
218	Cutting Reinforced concrete with mechanised tools like Core drilling machine etc. for cutting pockets, holes, cores in slab, beam, column or foundation as per direction of engineer in charge.	CUDM	**226**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
219	Providing and applying curing compound of approved make where ever required as per manufacturer's specification.	SQM	**19100**				
220	Providing & laying Plum cement concrete 1:3:6 with75% graded metal of maximum size 40 mm and 25%plums of maximum size 150 mm.	CUM	**4177**				
	300 FORM WORKS						
	Providing, fixing and removing formwork at any elevations for all structures, as per specifications and including all labour, material, scaffoldings and centereing complete including pockets etc. complete as per drawing, specifications and as per direction of engineer in charge for the following.						
301	Fairface form work with good quality water proof ply wood of required thickness and smooth surface below finished ground floor level for foundations, footings, base of columns, walls, columns, pilasters, beams, mass concrete, trenches etc.	SQM	**361121**				
302	Fairface form work with good quality water proof ply wood of required thickness and smooth surface above finished ground floor level for columns, beams, suspended floors, roofs, lintels, cantilevers, staircases, landings, balconies, domes, arches, circular overhead tanks etc. for all heights.	SQM	**114830**				
303	Fairface Formwork with good quality water proof ply wood of required thickness and smooth surface for TG superstructure (above base raft level) including preparation of scheme, designing, submission and approval of staging drawing with sufficient props, braces and ties at every tier of height of approx. 4m for all heights.	SQM	**4830**				
304	Providing, fixing and removing formwork in block-outs/pockets and openings (below 0.1 sqm plan area) at all elevations including cutting, formation of all shapes and all other operations required for making the required shape and size all complete as per specification, drawing and instruction of engineer in charge.						

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	Upto 150 mm depth	Each	**1580**				
b	Pockets of depths more than 150mm and upto 300 mm depth	Each	**510**				
c	Pockets of depths more than 300mm and upto 600 mm depth	Each	**381**				
d	Pockets of depths more than 600mm and upto 1000 mm depth	Each	**390**				
e	Pockets of depths more than 1000mm and upto 1500 mm depth	Each	**150**				
	400 REINFORCEMENT						
401	Providing, straightening, cutting, bending, placing in position at any level, binding of mild steel reinforcements conforming to grade 1 of IS:432 part 1 in concrete including cost of reinforcement and binding wire, labour, scaffolding, transportation to & from stores etc. all complete as per specifications & drawings.	MT	**163**				
402	Providing, straightening, cutting, bending, placing in position at any level, binding in position of steel reinforcements of TMT steel of grade Fe-500 confirming to IS:1786 including cost of binding wire, labour, scaffolding, transportation to & from stores etc complete all as per specifications, drawings and as directed by Engineer.	MT	**29454**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
404	Extra over ST No. 401, 402 & 403 for providing fusion bonded epoxy coating by mechanised & qualified process including blast cleaning to white metal as per Swedish code, heating in induction heater, electrostatically spraying the epoxy powder, complete fusion to give minimum coating thickness of 200-300 microns, gradual cooling without affecting the properties of steel, testing as per ASTM 775 and IS:13620, flexiblity & holiday test, proper packing, safe transportation, touchup at site, etc. complete to ensure proper resistance of FBE against corrosive enviornment including transport of the steel from BHEL site store to vendor plant and bringing back to site and special handling during straightening, cutting, bending, placing and providing PVC coated binding wire.	MT	**29179**				
406	Providing, straightening cutting, bending, placing in position at any level, binding of mild steel reinforcements in brickwork including cost of reinforcement and binding wire, labour, scaffolding etc. complete all as per specifications & drawings.	MT	**25**				
407	Providing, straightening, cutting, bending, placing in position at any level, binding in position high yield strength steel reinforcements in brickwork including cost of reinforcement and binding wire, labour, scaffolding etc. complete all as per specifications & drawings.	MT	**11**				
	500 WATER PROOOFING WORKS						
	Water proofing works including all labour, material, equipment, transportation, handling, curing, sampling, testing etc at any level as per specification, drawings and as directed by engineer - in - charge.						
501	Providing and laying underbed grading plaster with cement mortar 1:4 (1 cement : 4 sand) and average thickness of 15 mm including preparation of surface, batching, mixing, leveling etc. all complete.	**SQM**	**3255**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
502	Providing and laying in-situ light weight foam concrete insulation as per relevant IS Code in suitable panels over roofs followed by a layer of 15 mm thick cement sand plaster 1:4 (1 cement: 4 coarse sand) after the curing period of laid foam concrete and providing of expansion joint at intervals as per the recommendation of manufacturer. The insulating properties shall be such that the thermal conductivity shall not exceed 0.125 Kcal/sqm-hr deg C. Cost shall include making of fillets, cleaning & preparation of surface, expansion joints at suitable intervals etc all complete for following.						
a	Average 50 mm thickness of foam concrete	SQM	**31193**				
A504	Providing and applying bitumen felt water proofing for heavy treatment having bonding materials consisting of blown type conforming to IS: 702 or residual bitumen conforming to IS: 73 or a mixture of the two with seven courses as per IS 1346 using layer of type 2 grade 1 as per IS 7193 and with a minimum overlap of 75 to 100 mm of felt including preparation of surfaces etc all complete for following base felts (For description of layers refer specification):						
a	With hessian base felt	SQM	**615**				
b	With glass fiber base felt	SQM	**12978**				
c	With fiber base felt	SQM	**50**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
506	Providing and applying PU based water proofing treatment with one coat of polyurethane or any other equivalent material based primer with an application rate of minimum 6 sq.m per litre and two successive liquid coatings of high solids content urethane pre-polymers or equivalent material based finish coats as per relevant IS/ASTM standards to form an elastomeric membrane with overall dry film thickness 1.5 mm subject to minimum 500 gm/sqm/coat application rate. Item includes surface preparation by applying polymerized mortar, polyscrim cloth /fabric for edges, joints & vulnerable points etc all complete as per specifications and directions of engineer in charge.	SQM	**21505**				
A507	Providing and laying wearing course consisting of 40mm thick plain cement concrete of grade M15 (1:2:4) with graded aggregate of 12.5mm size cast in panels of maximum size 1.2mx1.2m and reinforced with 0.56 mm dia. galvanised chicken wire mesh and sealing of joints (in grooves of 6mm X 6mm) using silicon /elastomeric compound etc all complete.	SQM	**25255**				
508	Providing and laying cement concrete chequered flooring tiles of 22 mm thickness and size 250x250 mm / 300x300 mm conforming to IS 13801 with 8 mm thick 1:4 cement mortar over the top most layer of roofing treatment in pathway and entire equipment area with fine joints including sealing of joints (silicon/elastomeric sealant) etc all complete. (Water proofing paid elsewhere)	SQM	**11735**				
509	Providing and applying two coats of bitumen grade 85/25 as per IS 702 (@ 1.7kg/sqm)with 1% antistripping compound conforming to IS 6241 in foundation, wall, column etc on concrete surfaces exposed to soil / ash including surface preparation etc. all complete.	SQM	**208885**				
511	Providing and mixing water proofing compound conforming to IS:2645 in concrete or cement mortar all complete.	KG	**6994**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
512	Anti termite chemical treatment of soil with Chloropyrifos emulsifiable concentrates (1%) conforming to IS :8944 all complete.	SQM	**9500**				
513	Providing and applying concrete structures two coats of ERPB (Epoxy rasin based anticorrosive and chemical resistant paint) over a coat of CPCI (concrete penetrating bipolar corrosion inhibitor) with 300 to 325 micron DFT for protection of concrete against carbonation and chloride penetration in saline/marine enviornment all complete of approved make and as per manufacturer's recommendation	SQM	**150**				
A515	Providing and applying waterproofing treatment for the concrete surfaces of underground structure in contact with soil/ash including surface preparation etc. all complete with following layers:-						
a	For base slab, a 75 mm thick layer of PCC 1:4:8 followed by 25mm thk Cement Mortar 1:3 mixed with approved water proofing compound at the rate specified by the manufacturer. Over this two coats of acrylic polymer modified cement based flexible water proofing membrane of approved make laid as per manufacture's and instruction. Over water proofing membrane, 25mm thk Cement mortar 1:3 mixed with approved water proofing compound at the rate specified by the manufacturer provided, over which protective layer of 15mm thk kota / cuddapa or equivalent stone with joints sealed with cement mortar 1:3 shall be laid. Over this stone layer, 25mm thk Cement mortar 1:3 mixed with approved water proofing compound at the rate specified by the manufacturer shall be applied.	SQM	**19891**				
b	For side walls, two coats of acrylic polymer modified cement based flexible water proofing membrane of approved make laid as per manufacture's specification and instruction followed by 25mm thk Cement Mortar 1:3 mixed with approved water proofing compound at the rate specified by the manufacturer. Protective layer of 15mm thk kota / ciddapa or equivalent stone with joints sealed with Cement Mortar 1:3 shall be laid. Finally 25mm thk Cement Mortar 1:3 mixed with approved water proofing compound at the rate specified by the manufacturer shall be applied.	SQM	**21292**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
c	Providing and painting with 1.5 mm thick polyurea coating meeting ASTM D-16, Type V to concrete surface etc complete as per specification.	SQM	**43983**				
	600 JOINTS AND FILLERS						
	Joints & fillers including all labour, material, equipment, transportation, handling etc at any level as per specification, drawings and as directed by engineer - in - charge.						
A601	Supplying and installation of Dura board HD100 or its equivalent as approved by the Engineer, as filler material in joints including nailing, installation as per manufacturer's recommendation etc. all complete.						
a	12 mm wide joints	SQM	**300**				
b	20 mm wide joints	SQM	**221**				
c	25 mm wide joints	SQM	**1254**				
d	50 mm wide joints	SQM	**796**				
AA601	Supplying and installation of commercial quality of expanded polystyrene products from reliable manufacturers as approved by the Engineer, as filler material in joints including nailing, installation as per manufacturer's recommendation etc. all complete.						
a	12 mm wide joints	SQM	**125**				
b	20 mm wide joints	SQM	**158**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
c	25 mm wide joints	SQM	**354**				
d	50 mm wide joints	SQM	**100**				
602	Providing and applying polysulphide based sealant conforming to IS:12118 in expansion joints in concrete including cleaning of joints, raking out groove, application of primer, scaffolding etc. all complete for following size grooves:						
a	12mm X 25mm	RM	**688**				
b	20mmX25mm	RM	**884**				
c	25mmX25mm	RM	**2300**				
d	50mmX25mm	RM	**768**				
603	Supplying and filling in position hot applied bitumin sealing compund (Grade A) confirming to IS 1834 including cleaning, mixing, heating, pouring/injecting sealing compound in gaps in joints including application of primer etc. all complete.						
a	10mm X 40mm	RM	**500**				
b	12mm X 25mm	RM	**600**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
c	20mmX25mm	RM	**200**				
604	Supplying and filling in position hot applied bitumin sealing compund (Grade B) confirming to IS 1834 including cleaning, mixing, heating, pouring/injecting sealing compound in gaps in joints including application of primer etc. all complete.						
a	10mm X 40mm	RM	**100**				
b	12mm X 25mm	RM	**110**				
c	20mmX25mm	RM	**100**				
605	Providing and sealing of joints with premium grade silicon sealant (Silpruf of GE silicons or approved equivalent) including cleaning of joints, raking out groove, joint filler tapes, application of primer, curing, scaffolding etc. all complete as per manufacturer's recommendation for following size groove:						
a	25mmX25mm	RM	**150**				
b	50mmX25mm	RM	**50**				
606	Providing and fixing PVC water stops in joints conforming to IS 12200 & IS 15058 all complete for the following:						

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	150 mm wide and 8 mm thick	RM	**100**				
b	230 mm wide and 8 mm thick	RM	**100**				
c	150 mm wide and 6 mm thick	RM	**1259**				
d	230 mm wide and 6 mm thick	RM	**4185**				
A608	Providing and installing PVC joint sealing strips of minimum 3mm thickness and minimum width 100 mm at the construction, expansion and isolation joints from reputed manufacturers as a continuous diaphragm to contain the filler material and/ or to exclude passage of water or any other material into or out of the structure, without any longitudinal joint; and shall be procured and installed in largest practicable lengths having a minimum number of transverse joints with jointing procedure as per the manufacturer's recommendations including the material and tools required for jointing, testing, protection, etc all complete. The joints in rubber seals shall be vulcanished as needed.	SQM	**320**				
A609	Providing and installing strong and tough alkathene sheet or equivalent of about 1 mm in thickness in isolation joints and shall be fixed by an approved adhesive compound on the cleaned surface of the already set concrete as per the manufacturer's recommendations, to cover it fully including the material and tools required for jointing, testing, protection, etc all complete.	SQM	**158**				
A610	Providing and applying approved fire retardant sealant in joints/openings including cleaning of joints/openings, raking out groove, application of primer, scaffolding etc. all complete.	SQM	**200**				
	700 MS EMBEDMENTS						
	Embedments including all labour, material, equipment, transportation, handling etc. at any level as per specification, drawings and as directed by engineer - in - charge.						

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
701	Supply, fabricating and fixing of mild steel embedments, inserts, pipe sleeves, angle pieces, rungs of various diameters, plates of dimensions as required etc. including welding, bolting, cutting, drilling, scaffolding, setting etc. all complete.	MT	**380**				
702	Same as above with BHEL supllied material free of cost including loading, transportation, unloading etc. all complete from BHEL store to plant site.	MT	**247**				
703	Fixing of embedments, inserts, pipe sleeves, angle pieces, anchor bolts of various diameters, plates of dimensions as required etc. including scaffolding, setting in position, transportation from BHEL site stores to work spot etc. all complete.	MT	**52**				
704	Supply, Fabrication, transportation, delivery at site and erection, installation and alignment of mild steel foundation bolt assembly conforming to IS:2062 and grade 1 of IS:432 in concrete along with nuts, lock nuts (as per IS:1363, 1364 and IS:3138), washers, anchor plates, stiffner plates, protective tape, pipe sleeves, templates etc. including welding, cutting, grinding, threading, drilling etc. all complete.	MT	**200**				
705	Supplying, fabricating, erecting and installing following items in concrete/brickwall for all kind of works, including setting material in concrete, layout, scaffoling, cutting, forming, grinding, drilling, bolting, welding, jointing, testing etc. all complete.						
a	MS pipes of all diameters	Quintal	**72**				
b	PVC pipes / conduits of all diameters	Quintal	**300**				
c	UPVC pipes / conduits of all diameters	Quintal	**181**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
d	Expansion fasteners (mechanical galvanised) of HILTI make or equivalent of safe tensile capacity as specified below for brick work with expansion sleeve of A6 polyamide:						
i	Upto 250 kg	Each	**100**				
ii	Beyond 250 Kg and upto 500 kg	Each	**100**				
iii	Beyond 500 Kg and upto 750 kg	Each	**100**				
e	Expansion fasteners (mechanical galvanised) of HILTI make or equivalent of safe tensile capacity as specified below for concrete work with expansion sleeve of stainless steel:						
i	Upto 250 kg	Each	**100**				
ii	Beyond 250 Kg and upto 500 kg	Each	**100**				
iii	Beyond 500 Kg and upto 750 kg	Each	**100**				
706	Placing, locking and releasing of Vibration Isolation spring modules over the foundation at all elevations including providing all assistance under the supervision of the supplier, transportation from BHEL store, necessary staging, platforms, leveling, alignment etc. all complete.	Each	**512**				
	800 GROUTING						
	Grouting including all labour, material, equipment, roughening surface, cleaning, ramming, curing etc. at any level unless otherwise specified as per specification, drawings and as directed by engineer - in - charge.						

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A801	Providing & grouting with cement slurry mix of approved ratio using pressure pump for water retaining concrete structures as per approved procedure including cost of nipples/ nozzles, cement, admixture, curing, pressure pumps, slurry agitator etc. all complete. Cost shall include fixing of nipples at minimum 500 mm centre to centre spacing, cutting of nipples after completing of grouting, making good of the nipple hole with appropriate non-shrink cement paste, water tightness test etc. all complete wherever specified in the drawing. (Measurement is to be done in Kg of dry grout consumed.)	KG	**350**				
802	Providing & grouting of pocket holes, pipe sleeves under base plates, machinery, pipe supporting structures etc. with mix 1:1 (1 cement :1 sand) using non shrink admixture etc. all Complete.	CUM	**32**				
803	Providing & grouting of pocket holes, pipe sleeves and under base plate of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. all complete with mix 1:1:2 (1 cement : 1 coarse sand : 2 aggregate of 6 mm down graded stonechips) using non shrink admixture. (Cost of all material and cleaning the pocket by compressed air shall be in the scope of the contractor).	CUM	**131**				
804	Providing & grouting of pocket holes, pipe sleeves and under base plates of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. all complete with ConbextraGP-1 or equivalent. (Cost of all material and cleaning of the pockets by compressed air shall be in the scope of the contractor).	CUM	**158**				
805	Providing & grouting of pocket holes, pipe sleeves and under base plates of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing, etc. all complete with Conbextra GP-2 or equivalent. (Cost of all material and cleaning of the pockets by compressed air shall be in the scope of the contractor).	CUM	**11**				
	900 DOORS, WINDOWS, VENTILATORS, LOUVERS						
	Doors, windows, ventilators, louvers, roof ventilators, rolling shutters, partitions including all labour, material, equipments, master key system, transportation, handling, preparation of working drawings etc. at any level as per specification, drawings and as directed by engineer - in - charge.						

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
901	Providing and fixing wooden frame conforming to IS 4021 made of best quality seasoned CP teakwood free from large or loose knots, cracks or other defects including sand paper smoothening, hold fasts, beading, primer and finish painting / polishing etc. all complete with proper wood joinery, accurately set to required lines or levels and rigidly secured in place. (Finish painting / polishing paid separately)	CUM	**20**				
903	Providing, fitting and fixing solid core flush door shutter as per IS 2202 part II, 35mm thick homogenous particle board bonded with BWP type phenolformaldihyde synthetic resin, partical board core conforming to IS 3087 type I, 35x12 mm thick teakwood beading all around including preparation of working drawings. godrej or equivalent make mortice lock with handels on both sides,approved ISI mark anodised fittings like door stopper,300mm long tower bolts,16x300mm long aldrops ,125mm long handles on both sides etc. butt hinges, sliding bolt, knobs, (all fittings shall be anoidised aluminium color dyed), finish synthetic paint over primer, screws etc. all complete as per drawing, specification and instruction of engineer in charge. with commercial faces and teak wood edges. (Finish painting paid separately)	SQM	**50**				
A903	Providing, fitting and fixing teak veneered solid core flush door shutter (MDF exterior grade) as per IS 2202 part II, 35mm thick homogenous particle board bonded with BWP type phenolformaldihyde synthetic resin, partical board core conforming to IS 3087 type I, 35x12 mm thick teakwood beading all around including preparation of working drawings. godrej or equivalent make mortice lock with handels on both sides,approved ISI mark anodised fittings like door stopper,300mm long tower bolts,16x300mm long aldrops ,125mm long handles on both sides etc. butt hinges, sliding bolt, knobs, (all fittings shall be anoidised aluminium color dyed), screws etc. all complete as per drawing, specification and instruction of engineer in charge. with commercial faces and teak wood edges.	SQM	**100**				
AA903	Providing, fitting and fixing factory made prelaminated solid core flush door shutter (MDF exterior grade) as per IS 2202 part II, 35mm thick homogenous particle board bonded with BWP type phenolformaldihyde synthetic resin, partical board core conforming to IS 3087 type I including preparation of working drawings. godrej or equivalent make mortice lock with handels on both sides,approved ISI mark anodised fittings like door stopper,300mm long tower bolts,16x300mm long aldrops ,125mm long handles on both sides etc. butt hinges, sliding bolt, knobs, (all fittings shall be anoidised aluminium color dyed), screws etc. all complete as per drawing, specification and instruction of engineer in charge	SQM	**50**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
904	Providing and fixing single or double steel door shutters with 45mm thk flush design shutter comprising of two outer sheets of 18 gauge steel sheets rigidly connected and reinforced inside with continuous vertical 20 gauge stiffeners, spot welded in position at not more than 150mm on centres including void filled with mineral wool (density as per specification), all fittings, Godrej or equivalent make mortice lock with handle on both sides, shop and final painting etc all complete.	SQM	**628**				
905	Providing and fixing single or double steel door shutters with 18 gauge M.S. sheets shutter presenting a flush surface on the outside and inside stiffened with semitubular edge and central stiffening rail which shall convey the lock including fixtures, Godrej or equivalent make mortice lock with handle on both sides, shop and final painting etc all complete.	SQM	**150**				
906	Providing and fixing anodized extruded aluminium doors (single or double shutter) conforming to IS:1948, IS:1949 fabricated from extruded sections of HINDALCO/JINDAL or equivalent make having minimum 3mm wall thickness as per IS:1285, IS:733 and anodized and electro color coating of required shade as per IS 1868 (minimum anodized coating of grade AC15). fixed with rawl plugs, expansion fasteners,SS screws / fixing clips necessary filling of gaps at Junctions, at top, bottom & sides with required PVC / neoprene felt for bi-metallic protection etc. Glazing shall be clear float glass of 6mm thickness including snap fit type beading, concealed screws, fixtures, Godrej or equivalent make Mortice lock with handle on both sides, etc all complete. Aluminium section shall be smooth, free of stains, straight, mitred & jointed mechanically wherever required. (Glazing shall be paid separately)	SQM	**6**				
907	Providing and fixing fire proof steel doors (single or double shutter) with panic devices shall be 45mm thk flush design comprising of two outer sheets of 18 gauge steel sheets rigidly connected and reinforced inside with continuous vertical 20 gauge stiffeners, spot welded in position at not more than 150mm on centers including all fittings, shop painting with approved post office/signal red color fire resistant paint and mineral wool insulation (64 kg/cum density) complete and shall be fire proof as per IS:3614, TAC requirements and as per specification. Minimum ratings shall be 2 Hrs.(Panic devices to be provided at hand over.)	SQM	**379**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
908	Providing and fixing steel windows/ventilator with steel sections as per IS:1038, IS:1361 & IS:7452 latest revision.including all fittings, metal beadings, hold fasts, shop and final painting ,glazing etc. all complete. (Glazing shall be paid separately)						
a	openable type	SQM	**742**				
b	fixed type	SQM	**125**				
909	Providing and fixing anodised aluminium work of Jindal, Hindalco or other equivalent approved make for door frames, windows, ventillators, partitions, railing, grills etc with extruded standard tubular and other sections including all fittings & fixtures and accessories of approved make conforming to IS733 and IS1285, anodised and electro color dyed to required shade according to IS 1868 (minimum anodic coating of grade AC15), fixed with rawl plugs, expansion fasteners, SS screws or with fixing clips, including necessary filling of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt for bi-mettalic protection etc.including preperation of working drawings, aluminium cleat angle, aluminium snap-on-beading for glazing/panelling, stair case tread nosing, with all fittings and fixtures (like Godrej or equivalent make Mortice lock with handle on both sides, tower bolts, handles, door stopper with rubber shoes, 'L' drops, stays, floor springs, hydraulic door closures etc.), CP brass/stailess steel screws, providing and fixing hinges/pivots, and making provision for fixing of fitting wherever required including cost of PVC/neoprene gasket, all complete as per drawing, specification and instructions of engineer in charge (Glazing and panelling shall be paid seperately).Weight of aluminium section only shall be measured.	Kg	**91313**				
910	Providing and fixing of aluminium composite panel(ACP) of following thickness with PVDF or polyester coating for interior partition of approved shade ,color etc all complete as per specification.						
c	5mm	SQM	**50**				
911	Providing and fixing of door closers as per IS 3564 ,of approved make & quality all complete of following type :						
a	Over head hydraulic door closures	Each	**71**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
b	Floor mounted Hydraulic door closers	Each	**59**				
912	Providing and fixing pressed steel frames fabricated from 16 gauge M.S sheet mortised, reinforced drilled and tapped for hinges and locks bolts strikes, hold fasts adjustable floor anchors, floor tiles/weather bars ,paintings etc all complete as per specifications.	Kg	**13618**				
A913	Providing and fixing in position rolling shutter of hot rolled double dipped galvanised steel lath section of 18 SWG tested mild steel strips at 75mm rolling centres interlocked together through their entire length and jointed together at the end by end locks mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking (with push and pull operation for hand operated only) including wire springs, top cover, primer & shop coats of approved enamel paint etc, all complete as per IS 6248 and specification of approved make of following types: The bottom lath shall be coupled to a lock plate fabricated from 3mm thick galvanised steel plate and securely rivetted with stiffening angles.(partly coiled and lath/full lath).						
a	Hand Operated	SQM	**52**				
b	Mechanically Operated	SQM	**307**				
c	Electrically operated	SQM	**604**				
914	Providing and fixing PVC doors(25 thk double skin) of sintex or equivalent make including all fitting & fixtures as per specification, drawing and instructions of engineer in charge.	SQM	**370**				
915	Providing, fixing and fitting of glazing of first grade class in steel/aluminium/wooden frames, where ever required, cleaning after fixing including hardware, gaskets, clips, beadings etc. all complete.						

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	4 mm thick clear sheet glass	SQM	**1875**				
b	4 mm thick clear float glass	SQM	**125**				
c	5.5 mm thick clear float glass	SQM	**189**				
d	6 mm thick wired glass	SQM	**5372**				
e	6mm thick Polycarbonate sheet multi (twin) wall fire retardant and ultra violet resistant with sealed open edges.	SQM	**100**				
f	4 mm thick ground glass	SQM	**315**				
g	6 mm thick tinted heat reflecting type float glass	SQM	**88**				
Ag	6 mm thick clear float glass	SQM	**608**				
h	6 mm thick clear toughened safety glass	SQM	**496**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
i	Two nos. 6 mm thick clear toughened float glass hermetically sealed and separated by 12 mm thick air gap for thermal insulation (only single elevation area to be measured)	SQM	**740**				
j	Two nos. 6 mm thick tinted toughened float glass hermetically sealed and separated by 12 mm thick air gap for thermal insulation (only single elevation area to be measured)	SQM	**150**				
k	One outer 6mm thick tinted heat-reflecting type float glass and one inner 6mm thick plain float glass hermetically sealed and seperated by 12 mm thick gap for thermal insulation (only single elevation area to be measured).	SQM	**100**				
l	6 mm thick laminated glass	SQM	**100**				
916	Supplying and fixing weather stripping of approved make and quality to doors as per instructions of engineer in charge and specification complete.	RM	**100**				
917	Providing and fixing 12 mm thick BWP particle board, decorative veneer (prelaminated) on both sides, as panels in aluminium framed door shutter, fixed with necessary snap-on-beading etc. all complete (excluding aluminium works).	SQM	**1410**				
919	Providing and fixing 1 mm thk. MS sheet sliding shutters with frame and diagonal braces of 50X50X6 angle iron, 3 mm MS gusset plates at junction and corners, 25 mm dia pulley, 50X50X6 angle and T-iron guide at the top and bottom respectively including painting etc. all complete.	SQM	**50**				
920	Roof skylight structure for atrium with 6mm thick Polycarbonate sheet multi (twin) wall fire retardant and ultra violet resistant with sealed open edges for sky light for approved shape like dome, pyramidal etc. Joints are properly sealed with sealent, screws with pvc cap, self tapping screws, epdm rubber gasket.etc all complete as per detailed drawing and specification.	SQM	**150**				

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				(In fig)	(In Words)	(In fig)	(In Words)
A921	Supplying, installing and commissioning of self sliding mechanism for aluminum door (double shutter) including photo operated sensors, fittings, motors, mechnical systems, electrical systems, warranty all inclusive in working condition as per specifications and drawings (aluminum and glazing to be paid seperately)	EACH	**6**				
A922	Providing and fixing of wooden panels of veneered BWP grade plywood including teakwood baton grid for interior partition including fittings, fixtures etc all complete as per specification.	SQM	**185**				
A923	Providing and fixing 12 mm square MS rod grills for security on windows/ventilators including fixtures, painting etc. all complete.	SQM	**748**				
A924	Providing and fixing polished teakwood handrail on stainless steel/MS posts all complete as per specification and directions of engineer in charge (stainless steel/MS posts to be paid elsewhere)	CUdM	**461**				
	1000 BRICKWORK						
	Brickwork masonry including all labour, material, equipment, transportation, handling, scaffolding etc. at all levels as per specification, drawings and as directed by engineer - in - charge.						
A1001	Providing brick work in cement mortar 1:5 (1 part cement 5 parts coarse sand) in walls, chambers etc. in thickness varying from 230mm to 460mm at all depths, places and positions below plinth including raking out joints, curing, scaffolding etc. complete excluding plastering and painting.						
a	Using fly ash lime/cement bricks confirming to IS 12894 with crushing strength of 75 kg/cm2	CUM	**965**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
c	Using burnt clay bricks of class designation 7.5 of nominal dimension	CUM	**147**				
1002	Providing brick work in cement mortar 1:6 (1 cement 6 coarse sand) in walls, chambers etc. in thickness 230mm at all heights, places and position above plinth including raking out joints, curing, scaffolding etc complete excluding plastering and painting.						
a	Using fly ash lime bricks confirming to IS 12894 with crushing strength of 75 kg/cm2	CUM	**655**				
A1002	Providing brick work in cement mortar 1:5 (1 cement 5 coarse sand) in walls, chambers etc. in thickness 230mm at all heights, places and position above plinth including raking out joints, curing, scaffolding etc complete excluding plastering and painting.						
a	Using fly ash lime/cement bricks confirming to IS 12894 with crushing strength of 75 kg/cm2	CUM	**12160**				
c	Using burnt clay bricks of class designation 7.5 of nominal dimension	CUM	**774**				
1003	Providing brick work in cement mortar 1:4 (1 cement 4 coarse sand) in partition walls, chambers etc. in thickness 115mm at all heights, places and position above or below plinth/graded level including providing two nos. 8 mm diameter TMT bars at every fourth layer, raking out joints, curing, scaffolding etc complete excluding plastering and painting as per specification. (TMT bars to be paid elsewhere)						
a	Using fly ash lime/cement bricks confirming to IS 12894 with crushing strength of 75 kg/cm2	SQM	**200**				
A1003	Providing brick work in cement mortar 1:4 (1 cement 4 coarse sand) in partition walls, chambers etc. in thickness 115mm at all heights, places and position above or below plinth/graded level including providing two nos. 8 mm diameter TMT bars at every fourth layer, raking out joints, curing, scaffolding etc complete excluding plastering and painting as per specification. (TMT bars to be paid elsewhere)						

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				(In fig)	(In Words)	(In fig)	(In Words)
a	Using fly ash lime/cement bricks confirming to IS 12894 with crushing strength of 75 kg/cm2	SQM	**2198**				
A1004	Providing brick soling including spreading of earth, ramming, watering including 25mm thick cushion of sand complete but excluding excavation and disposal of surplus earth (excavation and disposal of surplus earth shall be measured under applicable item). Using brick on edge.						
a	Using fly ash lime/cement bricks confirming to IS 12894 with crushing strength of 75 kg/cm2	SQM	**150**				
A1005	Providing brick soling including spreading of earth, ramming, watering including 25mm thick cushion of sand complete but excluding excavation and disposal of surplus earth (excavation and disposal of surplus earth shall be measured under applicable item.).- Using flat bricks.						
a	Using fly ash lime/cement bricks confirming to IS 12894 with crushing strength of 75 kg/cm2	SQM	**100**				
1006	Breaking of existing brick work at all levels including plastering, removing the rubbish up to a distance of 500 m including transportation, loading, unloading etc. all complete as directed by the engineer.	CUM	**105**				
1007	Providing and encasing of structural steel member with masonary work around flanges, webs etc. and filling the gap between steel and masonry by minimum 12mm thick mortar. Encased member shall be wrapped with chicken wire mesh with 50mm lap etc. complete as per specification. (Chicken wire mesh to paid separately)	CUM	**52**				
1008	Providing and laying 75 mm thick bed of dry brick aggregate including of excavation, disposal of surplus earth spreading of earth, ramming, watering etc. complete in all respects as directed by the engineer.	SQM	**10**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1009	Making openings in existing brick wall or partition wall including making good the broken edges/surface with cement mortar etc. complete.	CUM	**75**				
1010	Supply and placing in position mild steel wire fabric of square mesh 25 mm size and wire diameter of 2 mm for encasing of steel sections in concrete including cutting, bending, fixing etc. complete.	SQM	**3000**				
A1010	Supply and placing in position chicken wire mesh at the junction of RCC/Structural steel and brickworks including cutting, bending, fixing etc. complete.	SQM	**920**				
1011	Filling existing brick wall/ partition wall opening at all level including making good the broken edges/surface with cement mortar, painting, finishing to match with existing finishing, scaffolding/supporting at any level, removal of debris upto a lead of 1 km including loading, unloading, transportation etc. all complete.	SQM	**70**				
1012	Providing and filling brick bats in soak pits all complete.	CUM	**100**				
	1100 DAMP PROOF COURSE						
	Damp proof course including all labour, material, equipment, transportation, handling, shuttering, centering, curing etc at any level as per specification, drawings and as directed by engineer - in - charge.						
A1101	Providing Damp Proof Course 50mm thick 1:1.5:3 concrete (10mm and down graded aggregate) with 2% of approved admixture of water proofing compound all complete. Two layers of hot bitumen coating 85/25 grade as per IS:702 @ 1.7Kg./sqm shall be applied one before & one after the DPC.	SQM	**2896**				
	1200 CEMENT MORTAR PLASTER						
	Cement mortar plaster including making grooves whereever required including all labour, material, scaffolding, curing etc at any level as per specification, drawings and as directed by engineer - in - charge.						

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1201	Providing 18mm thick plaster in two layers outside the building/boundary wall in cement mortar 1:6 on walls, finished to a smooth finish including providing 3mmx3mm size grooves at junctions of two dissimilar materials all complete.	SQM	**1751**				
A1201	Providing 20mm thick plaster in two layers outside the building/boundary wall in cement mortar 1:6 on walls, finished to a smooth finish including providing 3mmx3mm size grooves at junctions of two dissimilar materials all complete.	SQM	**3320**				
AA1201	Providing 20 mm thick in 2 coats, 1st coat of 12 mm thick in Cement Mortar 1:3 & 2nd coat of 8 mm thick in Cement Mortar 1:2 sand faced outside/inside the building/boundary wall finished to a smooth finish including providing 3mmx3mm size grooves at junctions of two dissimilar materials all complete.	SQM	**42390**				
1202	Providing 12mm thick plaster inside the building/boundary wall in cement mortar 1:6 on walls finished to a smooth finish as per specification all complete.	SQM	**3320**				
A1202	Providing 12mm thick plaster inside the building/boundary wall in cement mortar 1:3 on walls finished to a smooth finish as per specification all complete.	SQM	**95133**				
1203	Providing 12mm thick plaster in cement mortar 1:3 on walls with rough finish all complete.	SQM	**3735**				
1204	Providing 6mm thick plaster on ceiling in cement mortar 1:4 finished to a smooth all complete.	SQM	**4549**				
A1204	Providing 6mm thick plaster on ceiling in cement mortar 1:3 finished to a smooth all complete.	SQM	**27412**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1205	Providing 12mm thick plaster in walls, drains/culverts with a paste of neat cement @ 1kg/sqm and rubbed smooth with trowel etc. all complete.	SQM	**1100**				
1206	Providing and making decorative plaster of all types and design on walls, ceilings, arcs, columns with various thickness upto 18 mm including finishing all complete.	SQM	**20**				
1207	Forming groove of uniform size from 12X12 mm upto 20X15 mm in plastered surface as per approved pattern, using wooden battens nailed to the under layer, including removal of wooden battons, repair of the edges of plaster panel and finishing the groove etc. complete as per specification, drawing and the instructions of engineer in charge.	RM	**60**				
1208	Providing drip coarse on plastered surface at all elevations for all type of work such as chajjas, parapet, projections etc. including scaffolding, finishing etc. complete with all labour, tools and plants as per specification, drawing and instructions of engineer in charge.	RM	**1000**				
1209	Providing and laying encasement to box type steel beams at all levels with lath plaster 50 mm nominal thickness with cement plaster (1:4) over chicken wire mesh including all labour, materials, equipment, handling, transporting, mixing, placing, leveling, curing and cleaning, finishing the exposed surfaces etc including centering and shuttering all complete as per specification, drawing and instructions of enginner in charge (chicken wire mesh to be paid separately)	SQM	**455**				
1210	Ruled pointing in masonry in CM 1:3 (1 cement and 3 fine sand) including raking out joints, curing etc. complete.	SQM	**100**				
	1300 FINISHES TO CONCRETE / PLASTERED SURFACES						
	Finishes, painting to concrete, plastered surfaces including all labour, material, equipment, surface preparation, scaffolding etc. at any level as per specification, drawings and as directed by engineer - in - charge.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1301	Two or more coats of white wash/ colour wash as per IS 627 of approved brand and manufacture to give an even shade including a priming coat as per specifications.	SQM	**1680**				
1304	Two or more coats of acrylic distemper of approved brand and manufacture to give an even shade including a priming coat with distemper primer complete.	SQM	**1250**				
A1304	Two or more coats of acrylic washable distemper of approved brand and manufacture to give an even shade including a priming coat with distemper primer complete.	SQM	**111634**				
1305	Providing and applying two or more coats of acrylic emulsion paint as per IS 5411 of approved brand, shade and manufacture to give smooth, hard, durable & glossy finish over a coat of primer over prepared plaster surface as per manufacturers guideline.	SQM	**28181**				
1306	Providing and applying 2 or more coats of acid/alkali resistant paint of approved brand and colour to floors, walls and ceiling including preparation of surface to receive paint, providing and applying bitumen primer confirming to IS 158 complete all as per manufacturer's recommendations and as approved by engineer, at all heights above or below grade level, complete as per specifications.	SQM	**145**				
A1306	Providing and applying 2 or more coats of chlorinated rubber based paint of approved brand and colour to floors, walls and ceiling including preparation of surface to receive paint, providing and applying primer complete all as per manufacturer's recommendations and as approved by engineer, at all heights above or below grade level, complete as per specifications.	SQM	**7069**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1307	Two or more coats of fire resistant transparent paint as per IS 162 on all woodwork over french polish as per IS 348 or flat oil paint as per IS 137 of approved grade and manufacture to give an even shade as per specifications.	SQM	**100**				
1308	Two or more coats of black anti-corrosive bitumastic painting of approved brand and manufacture to give an even shade complete.	SQM	**100**				
1310	Providing and applying 3 coats of water proof cement paint of approved make and color on exterior surface at all heights including material, labour, scaffolding, curing etc including primer coat complete as per specification.	SQM	**106434**				
A1311	Providing and applying resin bonded granular textured finish of vineratex or equivalent, for external applications shall consist of crushed stone/quartz chips of .5 mm to 2.5 mm size and of approved natural color/shade and bonded with synthetic resins, adhesives and additives altogether in a single pack mix, applied on cured and dried plaster surface with a dry film thickness of minimum 2 mm. The final finish shall have UV resistance, fungus, bacterial resistance properties all complete with grooves filled with poly sulfide sealant of matching color and shade as per specification/drawing/approval of engineer in charge.	SQM	**6475**				
1312	Providing and applying 2 mm thick plaster of paris punning on walls including preparation of surface, staging, etc. to achieve a smooth even surface all complete as per specification and as directed by Engineer.	SQM	**27813**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1313	Providing and applying ready made Epoxy Paint over areas other than steel structure with suitable pigments of approved shade as per specification and direction of Engineer. The epoxy paint shall be a two pack material and shall be resistant to water, oil, splash, spillage & acidic environment. The epoxy paint coating shall be of minimum 4 mm thickness.	SQM	**150**				
A1316	Providing and applying two coats of Epoxy coating with suitable pigments of approved shade as per specification and direction of Engineer. The epoxy paint shall be a two pack material and shall be resistant to water, oil, splash, spillage & acidic environment. The epoxy paint coating shall be of minimum 150 micron thickness over epoxy primer.	SQM	**2542**				
	1400 FLOORING AND SKIRTING						
	Flooring and skirting at any level including base layer, labour, material, equipments, transportation, handling, curing, polishing etc. at any level as per specification, drawings and as directed by engineer - in - charge.						
1401	Providing and laying 50 mm thick heavy duty cement concrete in flooring with metallic hardener pigmented topping 12mm thick uniform graded treated iron paricles in flooring. Under layer of 38mm thick cement concrete mix 1:2:4 (1 cement: 2 sand : 4 stone aggregates 12.5mm well graded) and top layer of 12mm thick metallic concrete of mix 1:2 (1 cement hardner mix with approved quality metallic hardening compound :2 stone aggregate 6mm nominal size) by volume including cement slurry, rounding off edges, aluminium strips etc. all complete for following (Quoted item rate shall be inclusive of providing glass joint strips):	SQM	**615**				
A1401	Providing and laying 50 mm thick granolithic heavy duty cement concrete in flooring with non-metallic hardener pigmented topping 12mm thick in flooring. Under layer of 38mm thick cement concrete mix 1:1:2 (1 cement: 1 sand : 2 stone aggregates 12.5mm well graded) and top layer of 12mm thick non-metallic concrete of mix 1:2 (1 cement hardner mix with approved quality non-metallic hardening compound :2 stone aggregate 6mm nominal size) by volume including cement slurry, rounding off edges, aluminium strips etc. all complete for following (Quoted item rate shall be inclusive of providing glass joint strips)	SQM	**41677**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
AA1401	Providing and laying 50 mm thick granolithic heavy duty cement concrete in flooring of cement concrete mix 1:1:2(1 cement: 1 sand : 2 stone aggregates 12.5mm well graded) including cement slurry, rounding off edges, aluminium strips etc. all complete for following (Quoted item rate shall be inclusive of providing glass joint strips)	SQM	**19198**				
A1402	Providing and laying 25 mm thick granolithic heavy duty cement concrete mix 1:1:2 (1 cement: 1 sand : 2 stone aggregates) flooring with non-metallic hardener pigmented topping of 10 mm thick uniform graded particles in skirting and dado complete as per specification.	SQM	**423**				
AA1402	Providing and laying 25 mm thick granolithic heavy duty cement concrete mix 1:1:2 (1 cement: 1 sand : 2 stone aggregates) flooring in skirting and dado complete as per specification.	SQM	**209**				
A1403	Providing and laying precast polished heavy duty cement concrete tiles (Carborundum topping) of size 300X300X22 thick of approved shade as per IS 1237, including cement mortar bedding of 1:3 (1 cement : 3 sand) jointed with neat cement slurry etc. all complete with pigment to match the shade of the tiles including rubbing, curing, grindig and polishing complete with laying as per IS 1443 etc. all complete for following:						
a	Laid in floors	SQM	**8541**				
b	Laid in skirting	SQM	**160**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1405	Providing and laying 50 mm thick floor finish with 20mm thk Terrazo Tiles including cement mortar bedding of 1:3 (1 cement : 3 sand) with neat cement slurry etc. all complete.	SQM	**1030**				
A1405	Providing and laying 25 mm thick wall finish with cast in situ Terrazo including provision of base and etc. all complete.	SQM	**1040**				
1406	Providing and laying polished Kota stone 18mm to 20mm thk in flooring. Under bed shall average 30mm thk of 1 cement : 2 sand : 4 stone aggregates by volume and brought to proper level. The kota stone slabs/tiles laid over under bed, pressed and tapped down with wooden mallet to the proper level, lifted and pressed again with thick cement slurry spread over the surface with fine joint finished including pigments, curing, grinding, granite polishing etc. all complete.	SQM	**1119**				
1408	Providing polished Kota stone 18mm to 20mm thk in skirting projecting 6mm from adjacent plaster including cutting brickwall upto the required depth, edging, finishing etc. all complete.	SQM	**734**				
1412	Providing and laying 18-20mm thick polished Granite stone of approved color and texture in flooring with brass/ stainless steel strips. Under bed shall average 30mm thk of 1 cement : 2 sand : 4 stone aggregate by volume and brought to proper level. The granite stone slabs/tiles laid over under bed, pressed and tapped down with wooden mallet to the proper level, lifted and pressed again with thick cement slurry spread over the surface with fine joint finished including pigments, curing, grinding, granite polishing etc. all complete.	SQM	**1555**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1413	Providing and laying 14 to16mm thick polished Granite stone of approved color and texture in flooring with brass/ stainless steel strips. Under bed shall average 35mm thk of 1 cement : 2 sand : 4 stone aggregate by volume and brought to proper level. The granite stone slabs/tiles laid over under bed, pressed and tapped down with wooden mallet to the proper level, lifted and pressed again with thick cement slurry spread over the surface with fine joint finished including pigments, curing, grinding, granite polishing etc. all complete.	SQM	**254**				
1414	Providing and laying polished Granite stone 18-20mm thk in skirting and dado with 6mm thick projection from adjacent plaster including mortar ,cement slurry ,pigments, curing, grinding,moulding, granite polishing etc. all complete.	SQM	**24**				
1415	Providing and laying polished Granite stone 14-16mm thk in skirting and dado with 6mm thick projection from adjacent plaster including mortar ,cement slurry ,pigments, curing, grinding,moulding, granite polishing etc. all complete.	SQM	**12**				
A1416	Providing and laying vitrified ceramic tiles of polished variety of size 600x600 from reputed / approved manufacturer, complete including underbed of cement mortar 1:3 with neat cement slurry etc. all complete for following						
a	8 mm thick tiles In flooring	SQM	**16544**				
Aa	7.5 mm thick tiles In flooring	SQM	**192**				
b	8 mm thick tiles in skirting and dado upto specific height	SQM	**1610**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
Ab	7.5 mm thick tiles in skirting and dado upto specific height	SQM	**25**				
A1417	Providing and laying heavy duty anti skid ceramic tiles of matt finish of size 300x300mm from reputed / approved manufacturer including underbed of 43mm thick cement concrete mix 1:2:4 (1 cement: 2 sand : 4 stone aggregates 12.5mm well graded) etc. all complete for following.						
a	7mm thick tiles In flooring	SQM	**2376**				
c	7mm thick tiles In skirting and dado upto specific height	SQM	**2046**				
1418	Providing and laying 10 mm thk non-skid fully vitrified tiles of make 'MARBONITE' or 'FERRASTONE of BOSS Profile limited' or equivalent in flooring and skirting over 30 mm thick underbed of 1 part cement and 3 parts coarse sand by weight mixed with sufficient water, complete as per specification laid in pattern of following sizes						
a	400X400 mm	SQM	**26**				
b	600X600 mm	SQM	**26**				
A1418	Providing and laying 8 mm thk non-skid fully vitrified tiles of make 'MARBONITE' or 'FERRASTONE of BOSS Profile limited' or equivalent in flooring and skirting over 40 mm thick underbed of 1 part cement and 3 parts coarse sand by weight mixed with sufficient water, complete as per specification laid in pattern of following sizes						
a	400X400 mm	SQM	**764**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
b	600X600 mm	SQM	**1051**				
A1419	Providing and laying granite stone slab of 12 mm thickness single piece for wash basin / sink slab /facia of black or approved colour with cutting,making corners,moulding and opening etc. all complete.	SQM	**84**				
1420	Providing and laying Heavy Duty dust pressed Ceramic Tiles of 7mm thick of reputed manufacturer of approved finish shade and colour including underbed of cement mortar 1:3 with neat cement slurry etc. all complete.						
a	300X300 mm	SQM	**205**				
b	600X600 mm	SQM	**100**				
1421	Providing and laying Heavy Duty dust pressed (grade-5) Ceramic Tiles (Matt Finish) of size 600x600mm(approved size) and 7mm thick of reputed / approved manufacturer (Kajaria,jhonson,Spartek or equivalent) of approved finish, shade and colour. The tiles shall be scratch resistance of minimum 5 on Mohr's scale and shall have a bending strength of 350 Kg./sqm,with Under bed shall average 43mm thk of 1 cement : 2 sand : 4 stone aggregates by volume and brought to proper level including cement mortar all complete.	SQM	**20**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A1422	Providing & fixing Acid / Alkali resistant (Chemical resistant) tiles confirming to IS:4457 in flooring/Dado and shall be laid over bitumastic lining of min 12mm thick (to be laid in layers of 6mm each). The tiles shall be applied with 13 mm thick Potassium Silicate bedding mortar as per IS:4441, 4443 & 4832 and including preparation of surface, application of bitumen primer, curing etc. all complete for following thicknesses. The tiles should be abrasion resistant & durable.						
a	25mm thick	SQM	**12322**				
b	38mm thick	SQM	**50**				
1424	Providing & fixing chemical resistant (AR)(Acid / Alkali) bricks (75mm thick) conforming to IS:4860 in the floor of neutralization pit. Surface on which lining to be applied shall be prepared in accordance with IS:2395. Bitumen primer as per IS:158 followed by 18mm thick bituminastic followed by 6mm thick potassium silicate mortar bedding shall be provided before laying AR bricks. The joints between AR bricks shall be filled with resin type of mortar conforming to IS:4832, part II, seal coat of readymade epoxy paint shall be provided on joints to cover up any porosity that may be left in mortar. End sealing shall be done with bituminastic AR bricks shall be laid with 6mm wide & 50mm deep pointing (epoxy / furnace / CNSL) & acid curing shall be done all complete as per specification.	SQM	**244**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A1424	Providing & fixing chemical resistant (AR)(Acid / Alkali) bricks (115mm thick) conforming to IS:4860 in the wall of neutralization pit. Surface on which lining to be applied shall be prepared in accordance with IS:2395. Bitumen primer as per IS:158 followed by 18mm thick bituminastic followed by 6mm thick potassium silicate mortar bedding shall be provided before laying AR bricks. The joints between AR bricks shall be filled with resin type of mortar conforming to IS:4832, part II, seal coat of readymade epoxy paint shall be provided on joints to cover up any porosity that may be left in mortar. End sealing shall be done with bituminastic AR bricks shall be laid with 6mm wide & 50mm deep pointing (epoxy / furnace / CNSL) & acid curing shall be done all complete as per specification.	SQM	**498**				
AA1424	Providing & fixing chemical resistant (AR)(Acid / Alkali) bricks (38mm thick) conforming to IS:4860. Surface on which lining to be applied shall be prepared in accordance with IS:2395. Bitumen primer as per IS:158 followed by 12mm thick bituminastic followed by 6mm thick potassium silicate mortar bedding shall be provided before laying AR bricks. The joints between AR bricks shall be filled with resin type of mortar conforming to IS:4832, part II, seal coat of readymade epoxy paint shall be provided on joints to cover up any porosity that may be left in mortar. End sealing shall be done with bituminastic AR bricks shall be laid with 6mm wide & 50mm deep pointing (epoxy / furnace / CNSL) & acid curing shall be done all complete as per specification.	SQM	**369**				
1425	Providing and laying polished Marble slabs (Aranga white or equivalent approved shade/color /design) 20 mm thk in staircase landing/skirting and corridors over minimum 20 mm thick underbed of 1 cement : 2 sand : 4 stone aggregates by volume mixed with sufficient water to form a stiff workable mass. The marble slabs shall be laid over under-bed, pressed and tapped down with wooden mallet to the proper level, lifted and pressed again with thick cement slurry spread over the surface with fine joint finished including moulded marbel nosing, pigments, curing, grinding, making corners, granite polishing etc. complete.	SQM	**1**				
1427	Providing and fixing glazed ceramic tiles of approved color and design of size 200x300mm / 300x300mm in dado of approved size, projecting 6mm uniformly from adjacent plaster or wall finish. The mix for underbed plaster shall consist of 1part cement and 3 parts sand by weight. fairly moist but firm, tiles shall be pressed over under bed by applying cement slurry including pigments, curing etc all complete for following thicknesses:						
a	5mm thick	SQM	**510**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A1428	Providing and laying 2 mm thick antistatic PVC flooring / skirting of approved shade,as per IS:3462 and laying as per IS:5318 all complete.	SQM	**450**				
A1429	Providing and fixing removable type flooring system (Height of floor 800 mm)consisting of fire resistant particle board of size 600X600X35 mm with 0.05 mm thick aluminium foil lining at bottom and with 2 mm thick anti static PVC topping including proprietary floor supporting system complete as per specification.	SQM	**750**				
1430	Providing and fixing dividing strips in joints of cast in situ floorings at various elevations, finishing, all labour, material etc. complete as per drawing, specification and instructions of engineer in charge.						
a	Glass strips 40 mm wide and minimum 6 mm thick.	RM	**254**				
b	Aluminium strips 40 mm wide and minimum 3 mm thick	RM	**354**				
c	Brass strips 20 mm wide and minimum 4 mm thick.	RM	**145**				
	1500 ROOFING / SIDE CLADDING						
	Roofing / side cladding work including all labour, material, equipment, transportation, handling, scaffolding, laps, hooks, washers, corner pieces etc. at any level as per specification, drawings and as directed by engineer - in - charge.						

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A1501	Designing, providing and fixing permanently color coated galvanised MS troughed metal sheet decking plate of approved colour and conforming to class3 of IS 14246 over roof purlins for cast-in-situ roof slab as per relevant IS code and specification. Bare metal thickness of deck plate shall be minimum 0.8mm with minimum trough depth of 44 mm having minimum yield strength of 250 MPa and shall serve as permanent shuttering to the roof slab 100mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 150 kg/sqm during construction between purlins as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to purlins, side lapping, end lapping etc. all complete for below mentioned spans. The sheet shall be permanently coated with silicon modified polyster paint of minimum 20 micron DFT on exposed surface (facing operating floor) and minimum 7 micron on other face over epoxy primer applied over hot dipped galvanising @ 275 gm/sqm including fixing of sheet to purlin with self drilling white zinc plated heat treated carbon steel screws of minimum 5.6 mm dia @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant. Measurement of profile sheeting shall be of the plan area of roof covered by MS trough metal decking.						
a	Span Upto 1800mm	SQM	**6000**				
AA1501	Designing, providing and fixing permanently color coated galvanised MS troughed metal sheet decking plate of approved colour and conforming to class3 of IS 14246 over floor beams for cast-in-situ slab as per relevant IS code and specification. Bare metal thickness of deck plate shall be minimum 0.8mm with minimum trough depth of 44 mm having minimum yield strength of 250 MPa and shall serve as permanent shuttering to the slab 150mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 150 kg/sqm during construction between beams as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to beams, side lapping, end lapping etc. all complete for below mentioned spans. The sheet shall be permanently coated with silicon modified polyster paint of minimum 20 micron DFT on exposed surface (facing operating floor) and minimum 20 micron on other face over epoxy primer/phosphate primer applied over hot dipped galvanising @ 275 gm/sqm including fixing of sheet to purlin with self drilling white zinc plated heat treated carbon steel screws of minimum 5.6 mm dia @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant. Measurement of profile sheeting shall be of the plan area of floor covered by MS trough metal decking.						
a	Span Upto 1700mm	SQM	**2280**				
b	Span Exceeding 1700mm and upto 2500 mm	SQM	**918**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
AAA1501	Designing, providing and fixing permanently cold rolled troughed profile sheets manufactured from tested quality CR rolls as per IS:513 over roof purlins for cast-in-situ roof slab as per specification and relevant IS codes. Bare metal thickness of deck plate shall be minimum 0.8mm with minimum trough depth of 44 mm having minimum yield strength of 250 MPa and shall serve as permanent shuttering to the roof slab 100mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 150 kg/sqm during construction between purlins as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to purlins, side lapping, end lapping etc. all complete for below mentioned spans including Pre treatment and Phosphating of sheet with application of primer and final paint coating as per specification and fixing of sheet to purlin with self drilling white zinc plated heat treated carbon steel screws of minimum 5.6 mm dia @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant. Measurement of profile sheeting shall be of the plan area of roof covered by MS trough metal decking.						
a	Span Upto 1800mm	SQM	**4000**				
AB1501	Designing, providing and fixing permanently cold rolled troughed profile sheets manufactured from tested quality CR rolls as per IS:513 over floor beams for cast-in-situ floor slab as per specification and relevant IS codes. Bare metal thickness of deck plate shall be minimum 0.8mm with minimum trough depth of 44 mm having minimum yield strength of 250 MPa and shall serve as permanent shuttering to the floor slab 150mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 150 kg/sqm during construction between beams as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to beams, side lapping, end lapping etc. all complete for below mentioned spans including Pre treatment and Phosphating of sheet with application of primer and final paint coating as per specification and fixing of sheet to beam with self drilling white zinc plated heat treated carbon steel screws of minimum 5.6 mm dia @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant. Measurement of profile sheeting shall be of the plan area of roof covered by MS trough metal decking.						
a	Span Upto 1700mm	SQM	**1920**				
b	Span Exceeding 1700mm and upto 2500 mm	SQM	**2796**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1502	Providing and fixing shear connectors of mild steel studs having 16mm dia and minimum 75 mm projected length above purlin passing through metal decking as per relevant IS codes and specification.	QUINTAL	**151**				
1503	Designing, providing and fixing External sheet of Permanent colour coated metal cladding with troughed M.S. sheets of 0.6mm bare metal thickness having minimum yield strength 250 MPa and zinc-aluminium alloy coating not less than 150 gm/sqm total on both sides including fixing to supports / rails by concealed/exposed fixing system, corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing etc. all complete. The exposed face of the sheet shall be permanently colour coated with Polyfluro Vinyl Coating (PVF2) of minimum dry film thickness (DFT) 20 microns over suitable primer. Inner face of the sheet shall be provided with suitable pre-coating of minimum DFT 7 microns over suitable primer. The permanent colour coated sheet shall meet the general requirements of IS : 14246 and shall conform to class 3 for the durability.	SQM	**7953**				
A1503	Designing, providing and fixing External sheet of Permanent colour coated metal cladding with troughed M.S. sheets of 0.6mm bare metal thickness having minimum yield strength 250 MPa and zinc-aluminium alloy coating not less than 150 gm/sqm total on both sides including fixing to supports / rails by concealed/exposed fixing system, corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing etc. all complete. The exposed face of the sheet shall be permanently colour coated with Polyfluro Vinyl Coating (PVF2) of minimum dry film thickness (DFT) 20 microns over suitable primer. Inner face of the sheet shall be provided with same paint of minimum DFT 12 microns over suitable primer. The permanent colour coated sheet shall meet the general requirements of IS : 14246 and shall conform to class 3 for the durability.	SQM	**4500**				

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ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1504	Designing, providing and fixing External sheet of Permanent colour coated metal cladding with high strength tensile steel sheet 0.5mm bare metal thickness having minimum yield strength 350 MPa and zinc-aluminium alloy coating not less than 150 gm/sqm total on both sides including fixing to supports / rails by concealed/exposed fixing system, corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing etc. all complete. The exposed face of the sheet shall be permanently colour coated with Polyfluro Vinyl Coating (PVF2) of minimum dry film thickness (DFT) 20 microns over suitable primer. Inner face of the sheet shall be provided with suitable pre-coating of minimum DFT 7 microns over suitable primer. The permanent colour coated sheet shall meet the general requirements of IS : 14246 and shall conform to class 3 for the durability.	SQM	**6615**				
A1504	Designing, providing and fixing External sheet of Permanent colour coated metal cladding with high strength tensile steel sheet 0.5mm bare metal thickness having minimum yield strength 350 MPa and zinc-aluminium alloy coating not less than 150 gm/sqm total on both sides including fixing to supports / rails by concealed/exposed fixing system, corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing etc. all complete. The exposed face of the sheet shall be permanently colour coated with Polyfluro Vinyl Coating (PVF2) of minimum dry film thickness (DFT) 20 microns over suitable primer. Inner face of the sheet shall be provided with same paint of minimum DFT 12 microns over suitable primer. The permanent colour coated sheet shall meet the general requirements of IS : 14246 and shall conform to class 3 for the durability.	SQM	**4500**				
1505	Designing, providing and fixing Inner sheet of Permanent colour coated metal cladding with troughed M.S. sheets of 0.6mm bare metal thickness having minimum yield strength 250 MPa and zinc-aluminium alloy coating not less than 180 gm/sqm total on both sides of both sheets including fixing to supports / rails by concealed fixing system, corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing, Z spacers etc. all complete. The exposed surface of the sheet shall be permanently colour coated with silicon modified polyester paint of minimum dry film thckness (DFT) 20 microns over suitable primer. Other face of the sheet shall be provided with suitable pre-coating of minimum DFT 7 microns over suitable primer. The permanent colour coated sheet shall meet the general requirements of IS : 14246 and shall conform to class 3 for the durability. The sheet shall be fixed directly to side runners and Z spacers as per IS : 277. The sheet shall be fixed at the rate not more than 1500mm center to center to hold the insulation and external sheeting.	SQM	**11547**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1506	Providing and fixing insulation of resin bonded mineral wool of 50 mm nominal thickness conforming to IS 8183 having a density of 32 kg/cum glass wool or 48 kg/cum for rock wool, for cladding/under deck insulation including application of glue and tying with lacing wire, for glass/rock wool as per manufacturer's recommendations.	SQM	**6639**				
1507	Providing and fixing insulation of resin bonded mineral wool of 50 mm nominal thickness conforming to IS 8183 having a density of 32 kg/cum glass wool or 48 kg/cum for rock wool, for cladding/under deck insulation including wrapping in black polythene black supported over weld mesh 75X75X1.6 MM dia to hold in position and application of glue & tying with lacing wire, for glass/rock wool as per manufacturer's recommendation.	SQM	**5246**				
1508	Providing and installing under deck insulation using minimum 0.05 mm thick aluminium foil on exposed surface followed by 0.56 mm dia and 24 Gx 25 mm mesh GI wire netting, fixed at various elevations with rawl plugs including clips but excluding cost of insulation.	SQM	**404**				
A1508	Providing and installing fire resistant under deck insulation using Lloyd Foam or equivalent 50 mm thick polyurethane Foam including minimum 0.05 mm thick aluminium foil on exposed surface followed by 0.56 mm dia and 24 Gx 25 mm mesh GI wire netting, fixed at various elevations with rawl plugs including clips.	SQM	**11191**				
1509	Providing and fixing non metal opaque PVC sheet similar to ONDEX roofing or equivalent including all fixing accessories.	SQM	**100**				
1510	Providing and fixing 1 mm thick corrugated/semicorrugated G.I. sheet in roofs, cladding of minimum galvanisation of 275 gsm total on both sides with minimum 150mm overlapping, 8 dia G.I. hook bolts or 'J' Bolts and nuts @305 mm c/c along with G.I. and bitumen washers including cutting of sheets for opening etc. all complete.	SQM	**585**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1511	Designing, providing and fixing External roof cladding sheet of Permanent colour coated with troughed M.S. sheets of 0.6mm (or high tensile steel sheet of 0.5mm minimum thickness) for side cladding bare metal thickness having minimum yield strength 250 MPa and zinc-aluminium alloy coating not less than 275gm/sqm total on both sides including fixing to supports / rails by concealed fixing system, corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing etc. all complete. The exposed face of the sheet shall be permanently colour coated with Polyfluro Vinyl Coating (PVF2) of minimum dry film thickness (DFT) 20 microns over suitable primer. Inner face of the sheet shall be provided with suitable pre-coating of minimum DFT 12 microns over suitable primer. The permanent colour coated sheet shall meet the general requirements of IS : 14246 and shall conform to class 3 for the durability.	SQM	**1950**				
	1600 FALSE CEILING						
	False ceiling including all labour, material, equipment, transportation, handling, suspension system etc at any level as per specification, drawings and as directed by engineer - in - charge.						
1603	Providing and fixing permanently colour coated aluminium false ceiling of approved colour and Luxalon 84 C or approved equivalent with corrosion resistant aluminium alloy panels of minimum thickness 0.5mm including 50mm thick mineral wool insulation(density 48 kg/cum) conforming to IS:8183 bound in polythene bags on top of panels. Additional hangers and height adjustment clips shall be provided for return air grills, light fixtures, A.C. ducts etc all complete. Suitable M.S. channel grid with minimum MC 75 shall also be provided above the false ceiling level for movement of personnel to facilitate maintenance of lighting fixtures, AC ducts etc. (Materials for structural platform grid made up of MS Channels/ Beams / Angles shall be supplied by BHEL and shall be paid under ST No 2301)	SQM	**50**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A1603	Providing and fixing permanently colour coated aluminium false ceiling of approved colour (closed type plain panels) or approved equivalent with corrosion resistant aluminium alloy AA5050 panels of minimum thickness 0.5mm fixed on roll formed carriers. Additional hangers and height adjustment clips shall be provided for return air grills, light fixtures, A.C. ducts etc all complete. Suitable M.S. channel grid with minimum ISMC175 shall also be provided above the false ceiling level for movement of personnel to facilitate maintenance of lighting fixtures, AC ducts etc. (Materials for structural platform grid made up of MS Channels/ Beams / Angles shall be supplied by BHEL and shall be paid under ST No 2301)	SQM	**11281**				
1606	Providing and Fixing 12mm thick Gypsum board plain/perforated false celing tiles(600x600mm) of India Gypsum or equivalent make in plan or elevation with aluminium grid, metal suspension system, anchor fastener adjustable hangers etc. including one coat of primer, two or more coats of acrylic emulsion paint of approved colour to give an even shade with smooth finish all complete.as per architectural design and detail.metal suspension system as per ASTM C-635 shall be hot dipped M.S.galvanized (grade 180 as per is :277) nominal size of T-section shall be 24 x 38 mm or 24 x 25 mm cross runners. 24mm wide exposed flange surface shall be permanently color coated.suspension system shall be as per manufaturer's specification supported over movment platform.The work to be complete as per specifications, drawings and direction of engineer.(Materials for structural platform grid for movement made up of MS Channels/ Beams / Angles shall be supplied by BHEL and shall be paid under ST No 2301)	SQM	**754**				
	1700 RAIN WATER DOWN TAKE PIPES						
	Rain water down take pipes including all labour, material, transportation, 2 coats of approved paint over one primary coat, fixtures, accessories etc at any level as per specification, drawings and as directed by engineer - in - charge.						
1702	Providing and fixing galvanised MS down take pipes of 100 mm dia-Medium quality as per IS:1239(part-I) / IS:3589 all complete.	RM	**201**				
1704	Providing and fixing galvanised MS down take pipes of 150 mm dia-Medium quality as per IS:1239(part-I) all complete.	RM	**250**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1705	Providing and fixing UPVC down take pipes of 110mm diameter- Class 3 as per IS:4985 all complete.	RM	**859**				
1706	Providing and fixing UPVC down take pipes of 160mm diameter- Class 3 as per IS:4985 all complete.	RM	**592**				
1708	Providing and fixing HDPE down take pipes conforming to IS:4984 as per specification of following diameters.						
a	110 mm Dia	RM	**645**				
b	160 mm Dia	RM	**4053**				
c	150 mm Dia	RM	**430**				
d	200 mm Dia	RM	**953**				
	1800 MISCELLANEOUS WORKS						
	Miscellaneous works including all labour, material, equipment etc. at any level unless otherwise specified as per specification, drawings and as directed by engineer - in - charge.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1801	Providing and Filling in trenches, plinths, area paving and other underground structures with graded stone aggregate of size range 63 mm to 45 mm in layers not exceeding 230 mm in thickness including breaking of stone boulders to required sizes, filling the interstices with selected sand and compacting to 85 % of original volume of stone stack for all lifts etc. all complete. Payment shall be made for the measurement of the volume of the compacted fill.	CUM	**23803**				
1803	Anti termite chemical treatment of soil with Chlorpyriphos/Lindane E.C. 20% with 1% concentration conforming to IS:8944 and as per IS 6313 all complete. (Plinth area of building at ground floor only shall be measured for payment)	SQM	**2671**				
1804	Supply and installation of approved 25mm thick vibration damping resilient pads on/around foundation of vibrating equipment and at other locations all complete.	SQM	**85**				
1805	Providing 50mm thick premix carpet surfacing laid to slope in two layers 30mm and 20mm respectively with 12mm downgraded stone chips mixed with 80/100 grade bitumen @ 52 Kg/Cu.M including compaction etc. all complete.	SQM	**1240**				
1806	Providing 50mm thick anti corrosive layer laid to required slope consisting of clean & well graded coarse sand mixed with A90 grade bitumen for softening point upto 45 degree Celcius or A65 grade bitumen for softening point above 45 degree celcius as per IS: 73 or its equivalent quality 8 to 10% by volume and rolled or compacted all complete.	SQM	**1240**				
1807	Providing and fixing G.I strips minimum 1.5mm thk and 150mm wide including fixing accessories etc. all complete.	Kg	**100**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1808	Providing and fixing aluminium strips minimum 18 SWG thk and 300mm wide over expansion joints with minimum lap of 50mm length including brass / aluminium screws, rawl plugs etc. all complete.	Kg	**790**				
1809	Providing Chemical injection grouting with pressure pump for water retaining concrete structures conforming to IS:6494, including fixing nozzles, cost of approved cement, admixture, curing etc. all complete . Payment shall be made as per the consumption of chemical grout.	Kg	**100**				
1810	Providing, laying and fixing rails and guide rails in concrete for transformer, rail track including cutting of rails, joining of rails, anchoring lugs etc all complete.	MT	**193**				
1811	Providing and fixing weep holes in Drains consisting of 100 mm dia HDPE pipe sleeves with single side covering for the pipe mouth with galvanised welded wire fabric of 20 mm sq. opening covered with 40 mm downgraded aggregates in 300 X 300 mm sq. and 300 mm deep size all complete.	EACH	**30**				
1812	Laying of earthing mats/rods including risers, transportation from yard stores, loading, unloading, cutting to length, welding, protective painting of joints etc. all complete. (Excavation & Back filling shall be paid separately under respective item of earth work. Earthing mats/rods shall be supplied by BHEL free of cost)	MT	**299**				
1813	Providing Earthing pit as per drawing with charcoal & salt, GI pipes, GI earth electrodes, GI wire, GI strips, brick chamber with covers including associated earthwork etc. all complete.	EACH	**30**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1814	Construction of below ground earthing system test pits as per drawing/ sketches including brickwork, plaster, concreting, reinforcement, formwork, providing & fixing GI strips/pipes, GI wires, covers etc as per drawing & specification including associated earthwork.	EACH	**25**				
1815	Providing and fixing GI rungs in concrete/brick walls having zinc coating of minimum 900 g/sqm etc. all complete.	Kg	**3762**				
1816	Providing and fixing PVC pressure release valve of minimum dia 90mm in water retaining structure including 160 mm dia housing pipe of minimum length 3.75 m with perforation as per IS4558, nylon jali, perforated end plug, collar, graded filter, excavation, fixing in concrete slab/wall etc. all complete.	EACH	**255**				
1817	Providing and fixing HDPE pipes in concrete/ brick work of following sizes including cutting, fixing and levelling in position etc. all complete.						
a	Upto 75 mm dia	RM	**644**				
b	100 mm dia	RM	**145**				
c	150 mm dia	RM	**384**				
d	200 mm dia	RM	**168**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1818	Providing and laying dry stone pitching of 230 mm thickness for slope protection in cement mortar 1:6 including hammer dressing, raking of joints, pointing, preparing the bedding surface and voids filling with stone aggregate etc. all complete.	SQM	**158**				
A1819	Design, supply, fabrication, erection and epoxy painting of stoplog gates in CW Pumps with embedments required, lifting beams, special tools & plants, spare parts for three years, machining, casting, all materials such as groove of Stainless Steel 316L , stainless steel, brass used for seals, rubber seals, gears, ball and roller bearing, branch bushings, greasing, bolts, nuts, lugs, threaded fastners etc., cleaning, sand blasting, , erection along with a second stage concreting to true plumb and levels, submission of drawings / fabrication drawings for engineers approval etc all complete. The leakage through rubber seal shall not be more than 5 lit/min/metre length of seal under maximum head.(only weight of structural steel including embedments shall be considered for payment purpose). (Stainless Steel component shall be measured seperately for payment)	MT	**114**				
A1820	Stainless steel component mentioned under ST No. 1819/A1819/A1821/B1821	MT	**18**				
A1821	Supplying, fabricating, erecting in position and testing / examining bolted and / or welded structural steel work for stationary screens made out of stainless steel SS 316L mesh over MS frame including cutting, straightening if required, edge preparation, bolting / welding of joints, cleaning, sand blasting, galvanised with minimum coating of zinc as 750 gms/sqm followed by application of an etcing primer and dipping in black bitumen as per BS 3416 etc all complete.(Stainless Steel mesh shall be paid seperately).	MT	**24**				
1822	Cutting of groove of 10mm X 40mm size with groove cutting machine in concrete paving all complete.	RM	**355**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1823	Fire proofing of steel structures with VERMICULITE cementious coating including supply of all materials for vermiculite materials, reinforcement mesh (3mm thick wire, 50x50 size mesh) , nuts, tie wires, weldings, suface preparation, curing, staging, compatible paintings etc. all complete.	CUM	**15**				
1824	Supply & fixing expanded metal steel sheet conforming to IS:412. Size of mesh shall be 10mmX40mm with strands of 2.5mm width and 1mm thickness to the structural steel for facilitating fireproofing works.	SQM	**20**				
1825	Supply and laying approved quality Stone aggregate 40mm size in transformer yards.	CUM	**501**				
1826	Supply and laying approved quality rounded pebbles / gravels of 40mm size in transformer yards.	CUM	**356**				
1827	Supply and laying fire clay refractory brick work with fire clay mortar conforming to IS: 6 & 195 including curing etc. all complete on tank pads & in building walls.	CUM	**10**				
1828	Dismantling old existing reinforced/non-reinforced brickwork/blockwork/stone masonary work in mud/lime/ cement mortar at any level including clearing/cleaning, stacking the serviceable materials at plant site and disposal of unserviceable materials within a lead upto1km all complete.	CUM	**55**				
1829	Dismantling old existing plain/re-inforced concrete work at any level including clearing/cleaning, stacking the serviceable materials at plant site and disposal of unserviceable materials within a lead upto 1km all complete.	CUM	**68**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1830	Dismantling old existing structural steel work at any level including plates, bolts, cutting rivets, welding, dismembering and stacking the dismantled materials within a lead upto 1km etc all complete.	MT	**53**				
A1831	Sprinkling of water by water tanker fitted with perforated GI pipe (portable tanker minimum 3000 litre capacity) for roads and miscellaneous area within plant boundary including using hose for sprinkling water wherever required, for dust supression and reduction of suspended material at site for day to day work, as directed by BHEL site engineer (water for this purpose shall be provided by BHEL free of cost and utilisation of machine will be in terms of Tank-hour put in actual use for water sprinkling).	TANK-HR	**1000**				
1832	Providing & filling Bentonite Powder (Sodium base) mixed with water in electronic earthing pit as per drawing & direction below ground level including all materials, transportation, labour, incidental etc all complete as per specification.	CUM	**10**				
1833	Supply & fixing FRP (fibre reinforced plastic) sheets 2 mm thick including GI hooks/ J or L bolts, nuts, washers, bitumen washers etc. complete including overlap 100mm .	SQM	**390**				
A1834	Anti weed chemical treatment of soil with suitable chemical etc all complete.	SQM	**100**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A1835	Providing and placing approved quality of 250 micron thick heavy duty low density polyethylene liner (LDPE) films manufactured from polyethylene resin over cement sand mortar 1:4 in the base of reservoir/pond as well as on side slopes of embankment to prevent seepage including joining with approved method including testing, necessary excavation, fixing at the edges in plain cement concrete by providing 400mm wide and 300mm thick plain cement concrete 1:2:4 on the top of embankment (the cost of plain cement concrete 1:2:4 shall be excluded and shall be payable separately) as shown in the drawing etc all complete as per specification and as directed by the engineer-in-charge. Minimum width of LDPE liner shall be 6m.	SQM	**9086**				
A1836	Providing and placing 300mmx300mm size and 75mm thick precast concrete tiles of grade M-20 over 50 mm thick 1cement:4sand mortar on LDPE liner at the bed of reservoir and on side slopes of embankment, filling joints with 1cement : 3sand mortar etc all complete as per specification and as directed by the engineer-in-charge. The rate shall be inclusive of cement sand mortar as well.	SQM	**9086**				
A1837	Supplying, stacking and laying sand of approved quality as sand blanket/cushion over base/bed and on slopes of embankment/canal including screening, washing (wherever required), watering, compaction, dressing, necessary trimming if any including all leads and lifts etc all complete as per specification and as directed by the engineer-in-charge.	CUM	**2600**				
A1838	Providing random rubble (RR) stone masonary in founadation, super structure, boundary wall, retaining wall and embankment with cement mortar 1:6 at all elevations including all labour, material, equipment, handling, scaffolding etc. all complete.	CUM	**10**				
A1839	Providing and fixing sliding layer of bitumen paper or craft paper over the screed layer for water retaining structures to destroy the bond between the screed and the base slab concrete of the water retaining structure etc all complete.	SQM	**100**				
A1843	Design of scheme and layout for Rain water Harvesting system for the plant in consultation with 'Central ground water authority/Board or State ground water authority or MOEF authorized agency', submission to BHEL/TANGEDCO, incorporation of comments in submitted scheme and layout to finally obtain approved scheme and layout from BHEL/TANGEDCO including all necessary expenses, consultancy charges etc. all complete as per specification.	LUMPSUM	**1**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
	2000 FENCING AND GATES						
	Fencing and gates including all labour, material, equipment etc at any level as per specification, drawings and as directed by engineer - in - charge.						
2001	Supplying and erecting in position 2.4 m high PVC coated galvanised chain linked fencing of minimum 8 gauge (including PVC coating) of mesh size 75mm x 75mm. The diameter of the hot dip galvanised steel wire for chain link fencing excluding PVC coating shall not be less than 12 gauge. GI barbed wire fencing of height of 600 mm confirming to IS 298 at top of chain link fencing shall be provided with 4 strands of barbed wire hot dip galvanised wire of 12G comprising of 2 ply of wires with barbs of 16G spaced at 100mm. Cost to include for GI hook bolts, rings & washers, hot dip galvanised tension wires, 25X6 mm GI flat stretcher bar at end posts, accessories etc. all complete. (Structural post shall be separately under item 2007)	RM	**459**				
2003	Supplying and erecting in position 2.4 m high PVC coated galvanised chain linked fencing of minimum 8 gauge (including PVC coating) of mesh size 75mm x 75mm. The diameter of the hot dip galvanised steel wire for chain link fencing excluding PVC coating shall not be less than 12 gauge. Concertina of height of 600 mm at top of chain link fencing shall be provided with all accessories. Concertinal shall be from tensile serrated galvanised wire (HTSW) made with wire diameter of 2.5 mm which will be stretched to 6m and attached on two strands of galvanised HTSSW (high tensile spring steel wire) of 2.5mm dia by means of clips at 1m interval. These two HTSSW strands will be attached to the fence posts/ angles with 12 mm security fasteners. Cost to include for GI hook bolts, rings & washers, hot dip galvanised tension wires, 25X6 mm GI flat stretcher bar at end posts etc. all complete. (Structural post shall be separately under ST No. 2007)	RM	**560**				
A2005	Supplying and fixing 1000mm high G.I. barbed wire fencing on top of boundary wall consisting of 8 string barbed wire of 6 guage with 8 strands and with anti climbing arrangement of 50x50x8 Y shaped angles including GI clips, anchors, accessories etc. all complete. (Structural post shall be separately under ST No. 2301)	RM	**9950**				
2008	Supply, fabrication and fixing of mild steel posts for fencing including painting etc all complete.	MT	**1**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2009	Supply, fabrication and installing in position and testing galvanised MS Gates out of channels, joists, angles, flats, plates, pipes, welded steel wire mesh & sheets including stiffners, bracings, fabricated hinges, MS Aldrops with locking arrangement, tempered steel pivot, guide track of MS Tee, bronze aluminium ball bearing arrangements, castor wheels, paintings etc. all complete.	MT	**8**				
2010	Supply, fabrication and installing in position and testing MS Gates out of channels, joists, angles, flats, plates, pipes, welded steel wire mesh & sheets including stiffners, bracings, fabricated hinges, MS Aldrops with locking arrangement, tempered steel pivot, guide track of MS Tee, bronze aluminium ball bearing arrangements, castor wheels, paintings etc. all complete as per specification.	MT	**90**				
A2011	Supply, fabrication and installing in position Motorized sliding MS gate of approved size and design, erecting and fixing at main enterance including all guides, rails, alignments, control panels, switches, paintings etc all complete as per specification and as directed by Engineer. The gate shall be operable by push button at designated areas at both the guard house and the security office in the Administration / Plant Service area, and by card reader or key switches	MT	**25**				
	2100 WATER SUPPLY						
	Water supply work including men, material, equipment etc. at any level as per specification, drawings and as directed by engineer - in - charge.						
2101	Providing and fixing in position tested heavy duty type chromium plated (CP) brass long neck bib cocks including sockets, union, nuts etc all complete - 15mm nominal bore.	EACH	**365**				
2102	Providing and fixing in position heavy duty brass stop cock of approved quality including all specials etc all complete - 15mm nominal bore.	EACH	**289**				
2103	Providing and fixing in position heavy duty brass full way valve with wheel of approved quality including all specials etc all complete for following sizes:						

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	25mm nominal bore.	EACH	**86**				
b	50mm nominal bore.	EACH	**76**				
2104	Providing and fixing GI pipes class B medium class conforming to IS:1239 pipes shall be concealed and painted with anticorrsive paint, complete for internal works with GI sockets, unions, elbows, tees, nipples etc and clamps including cutting and making good the walls etc all complete for following sizes:						
a	15 mm nominal bore.	RM	**780**				
b	20 mm nominal bore.	RM	**520**				
c	25 mm nominal bore.	RM	**400**				
2105	Providing and fixing GI pipes class B complete for external work with GI sockets, unions, elbows, tees, nipples etc including trenching & refilling, anti-corrosive paint etc all complete for following sizes:						
a	15 mm nominal bore.	RM	**730**				
b	20 mm nominal bore.	RM	**1034**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
c	25 mm nominal bore.	RM	**1494**				
d	50 mm nominal bore.	RM	**269**				
2106	Providing and fixing 610mmx453mmx6mm thk mirror from reputed mirror manufacturer. Mirror shall be mounted with glass adjustable revolving CP brackets with CP screws etc all complete.	EACH	**54**				
A2106	Providing and fixing 1200mmx900mmx5.5mm thk mirror from reputed mirror manufacturer. Mirror shall be mounted with glass adjustable revolving CP brackets with CP screws etc all complete.	EACH	**99**				
2107	Providing and fixing 610mmx127mmx6mm thk clear glass with C.P Guard rails and mounted on C.P. brackets etc all complete.	EACH	**29**				
2108	Providing and fixing 25 mm diameter stainless steel towel rails (600mm X 25mm) all complete.	EACH	**98**				
2109	Providing and fixing 20mm dia chromium plated M.S. pipes wall mounted towel rod with C.P. Brackets etc all complete.	EACH	**18**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2110	Providing and fixing C.P. soap holder mounted with C.P. screws etc all complete.	EACH	**98**				
A2111	Providing and fixing stainless steel liquid soap dispenser. Dispenser shall be round and easily revolving with removable threaded nozzle and mounted on C.P. brackets etc all complete.	EACH	**98**				
2112	Providing and fixing glazed vitreous wall mounted paper holder with suitable cover cum cutter fitted with CP screws etc. sll complete.	EACH	**50**				
2113	Providing and fixing chromium plated brass shower rose with 15 or 20 mm inlet all complete.	EACH	**25**				
A2114	Providing & fixing in position P.V.C. water tank of Syntex or approved equivalent including making all necessary inlet & outlet pipes, fixture, ball cocks, valves etc all complete for following capacities. GI pipes shall be paid separately under ST No. 2105.						
a	1000 litres capacity	EACH	**46**				
b	2000 litres capacity	EACH	**41**				
c	5000 litres capacity	EACH	**4**				
d	10000 Liters capacity	EACH	**2**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2115	Providing and fixing approved stainless steel sink with integrated drainboard as per IS:13983 of size 915x460x178mm with CI brackets, stainless steel chain with rubber plug 40mm, cp brass waste trap with necessary union complete including painting the fittings, cutting and making good the wall where required etc. all complete.	EACH	**6**				
A2116	Providing and fixing glass shelves 600mmx127mmx4 mm with chromium plated brackets all complete.	EACH	**25**				
A2117	Providing and fixing metal storing cabinets all complete.	EACH	**65**				
A2118	Providing Minimum 600 mm long porcelain tray etc all complete..	EACH	**65**				
A2119	Providing and fixing Recessed porcelain soap tray in shower area etc all complete.	EACH	**65**				
A2120	Providing and fixing grab bars, barrier-free access and appropriate fittings and fixtures for toilets for handicapped etc. all complete.	EACH	**25**				
	2200 SANITARY WORKS						
	Sanitary work including all labour, material, equipment etc. at any level as per specification, drawings and as directed by engineer - in - charge.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2201	Supply and fixing glazed vitreous china Wash Basin conforming to IS:2556 part 4 of oval shape with R.S. or C.I. brackets painted white, 15mm chromium plated brass hot & cold faucets with nylon washers, chromium plated brass chain with rubber plug, 32mm chromium plated brass bottle trap and waste of standard pattern, 32mm dia chromium plated brass trap unions, plastic connection pipe with chromium plated nuts, fittings, cutting and making good the walls where required etc all complete.						
a	White	EACH	**50**				
b	Colored	EACH	**133**				
2202	Providing and fixing approved vitreous china laboratory sink of size 600x400x200mm conforming to IS:2556 (part-5) with R.S. or C.I. brackets, chromium plated brass chain with rubber plug 40mm, CP brass waste and 40mm CP brass trap with necessaary union complete including painting the fittings, cutting and making good the wall where required etc. all complete.	EACH	**14**				
2203	Providing and fixing stainless steel kitchen sink of size 610x510x200mm conforming to IS: 13983 including all fittings etc. all complete.	EACH	**7**				
A2203	Providing and fixing stainless steel kitchen sink of size 600x400x200mm conforming to IS: 13983 including all fittings etc. all complete.	EACH	**5**				
2204	Providing and fixing colour glazed vitreous china European type water closet conforming to IS:2556 with siphon, open front solid plastic seat and plastic cover, low level 12.5 litre PVC flushing cistern (same colour as WC) with valveless fittings, necessary C.P connections etc all complete.						
a	Floor mounted	EACH	**69**				
b	Wall mounted	EACH	**14**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2205	Providing and fixing colour glazed vitreous indian type Orissa pattern (580x440mm) water closet conforming to IS:2556 part 3 with all fittings including foot rests, low level 12.5 litre PVC flushing cistern with valveless fittings, necessary C.P connections etc all complete.	EACH	**70**				
2206	Providing and fixing white flat back glazed vitreous china urinals of size 440x265x355 mm with photo voltaic control flushing system as per IS:2556 (part 6, section 1) with flush pipes, lead pipes, gratings, traps and necessary C.P. fittings etc. all complete.	EACH	**150**				
2207	Supply, laying and jointing UPVC pipes of class 3 as per IS:4985 including bends, branches and all other necessary fittings, M.S holder bats/clamps, cutting and making good the walls and floors, jointing, testing etc all complete for following.						
a	75mm dia pipes	RM	**254**				
b	110mm dia pipes	RM	**145**				
c	160mm dia pipes	RM	**567**				
d	200mm dia pipes	RM	**456**				
A2207	Supply, laying and jointing Supreme B class stoneware pipe including bends, branches and all other necessary fittings, socket and spigot joint, M.S holder bats/clamps, cutting and making good the walls and floors, lead jointing, testing etc all complete for following.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	110mm dia pipes	RM	**1110**				
2208	Providing, laying light duty non pressure NP3 class RCC pipes with collars jointed with stiff mixture of cement mortar 1:2 including testing of joints etc all complete for following.						
a	200mm dia	RM	**4120**				
Aa	250 mm dia	RM	**250**				
b	300mm dia	RM	**225**				
Ab	400mm dia	RM	**150**				
c	450mm dia	RM	**145**				
d	600mm dia	RM	**145**				
e	900mm dia	RM	**145**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2209	Providing, laying light duty non pressure NP2 class RCC pipes with collars jointed with stiff mixture of cement mortar 1:2 including testing of joints etc complete for following.						
a	150mm dia	RM	**190**				
Aa	200mm dia	RM	**280**				
b	250mm dia	RM	**330**				
c	300mm dia	RM	**230**				
d	500mm dia	RM	**170**				
2210	Providing, laying light duty non pressure NP4 class RCC pipes with collars jointed with stiff mixture of cement mortar 1:2 including testing of joints etc complete for following:						
a	400mm dia	RM	**50**				
2211	Providing and fixing C.I Manhole heavy duty cover of size 600mmx450mm including frame from reputed manufacture etc. all complete.	EACH	**140**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2212	Providing and fixing circular heavy duty C.I. manhole cover of 600 mm dia with frame etc. all complete.	EACH	**25**				
2213	Providing and fixing square mouth S.W Gully trap grade 'A' complete with CI grating, brick masonry chamber and water tight CI cover with 300x300mm (inside). The weight of cover to be not less than 4.53 Kg and frame to be not less than 2.72 Kg etc all complete for following sizes:						
a	100x100mm P or S Type.	EACH	**20**				
b	150x100mm P or S Type.	EACH	**23**				
c	150x150mm P or S Type.	EACH	**52**				
2215	Providing and fixing C.I. floor traps with C.P jalli all complete.	EACH	**281**				
2216	Providing and fixing heavy duty UPVC floor traps with C.P jalli all complete.	EACH	**20**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2217	Providing and installing approved brand single tap water cooler of 80 L cooling capacity all complete.	EACH	**46**				
2218	Providing and installing approved brand single tap water cooler of 150 L cooling capacity all complete.	EACH	**15**				
2219	Providing and fixing white viterous urinal partitions of size 675x325x85mm all complete.	EACH	**15**				
2220	Providing and fixing eye and face drinking water fountain (combined unit with receptacle conforming to IS: 10592) all complete as per specification.	EACH	**20**				
A2221	Supply, laying and jointing HDPE pipes including bends, branches and all other necessary fittings, M.S holder bats/clamps, cutting and making good the walls and floors, jointing, testing etc all complete for following.						
a	75mm dia pipes	RM	**156**				
b	110mm dia pipes	RM	**124**				
c	160mm dia pipes	RM	**1010**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
d	200mm dia pipes	RM	**510**				
	2300 STRUCTURAL STEEL						
	Structural steel works including all labour, material, equipments, transportation, handling etc. at any level as per specification, drawings and as directed by engineer - in - charge.						
2301	Supply, fabrication and erection of structural steel with mild steel rolled section / built up section / combination of both conforming to IS:2062, pipes conforming to IS:1161/ IS:1239, chequered plate conforming to IS: 3052, mild steel rounds, monorails, stays, safety chains, ladders, MS grating etc. in columns, beams, gantry girders, bunkers, silos, hoppers, roof trusses, portals, laced purlins, space frames, hangers, struts, monorails, galleries, stiffeners, wall beams, sheeting runners, brackets, stub columns, bracings, cleats, trestles, base plates, splice plates, chequered plate flooring, decking and seal plates, steel frame grid over false ceiling, walkway platforms, ladders, stairs, stringers, treads, landings, hand-rails etc including 2 coats of redoxide zinc-chromate primer (one coat at shop and one coat after erection), connection design & preparation of fabrication drgs, collection of steel from stores, fabrication, straightening, cutting, bending, rolling, grinding, machining, drilling, welding, electrodes and other consumables, alignment, erection bolts & nuts (weight of erection bolts, nuts and welds not payable), assembly, edge preparation, preheating (min preheat and interpass temperature of 20o C for welding over 20 mm and upto 40 mm & 66o C for welding over 40 mm and upto 63 mm & 110o C for thickness over 63 mm & use of low hydrogen/ radiogenic electrodes), post heating, testing of welders, inspection of welds, visual inspection, non destructive and special testing, rectification and correction of defective welding works, production test plate, inspection and testing, erection scheme, protection against damage in transit, stability of structures, installation of temporary structures, setting column bases, surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, touch-up painting, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable), return of surplus / waste steel materials to store etc all complete. Including appointment of a seperate agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL.	MT	**22560**				
2302	Extra over ST NO. 2301 for blast cleaning of steel structures to near white metal surface(Sa 2 1/2) and applying epoxy based zinc phosphate primer in coats of minimum 25 micron (DFT) at shop and 25 micron (DFT) after erection, instead of primer coat of red oxide zinc-chromate, including touch-up painting etc all complete.	MT	**171**				
A2302	Extra over ST NO. 2301 for blast cleaning of steel structures to near white metal surface(Sa 2 1/2) as per SIS 05-5900 and applying 100 micron total DFT zinc silicate primer(two coats of 50 mm DFT each), instead of two coats of primer of red oxide zinc-chromate, including touch-up painting etc all complete.	MT	**22445**				
2304	Providing and applying two coats of synthetic enamel paint with minimum 50 micron total dry film thickness (DFT) of approved make and shade to achieve an even shade over steel sections already having primer coats and keeping overall DFT with primer not less than 110 microns including protection and cleaning, scoffolding etc. all complete.	MT	**114**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A2305	Providing and applying two coats of high built epoxy based colour Finish paint of approved brand with minimum 90 micron Dry film thickness of each finish coat including protection and cleaning, scaffolding etc. all complete.	MT	**22445**				
2306	Providing, laying and clamping of crane rails over the crane girder at all elevations as per IS 3443 including all fixtures, clamps, testings etc. all complete as per drawing and specification.	MT	**32**				
2307	Supplying, fabrication, erection and alignment of factory made electroforged galvanised grating units with mild steel (having minimum galvanisation of 610 g/sqm) conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	MT	**482**				
2309	Extra over above ST NO. 2301 for finishing the grating units with hot dipped galvanisation @ 610 gm/sqm over blast cleaned steel surfaces instead of painting with two coats of red oxide zinc-chromate primer all complete.	MT	**26**				
2310	Providing and fixing in position of permanent mild steel bolts (class 4.6 as per IS : 1367 and grade `C' as per IS: 1363) and nuts, washers etc. up to and inclusive of 39 mm diameter and upto 300mm long for structural steel work etc all complete.	Quintal	**69**				
2311	Providing and fixing in positing of high strength structural bolts (of property class 8.8 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	Quintal	**1439**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2312	Dismantling of steel structure, lowering of material and carriage of the dismantled material up to field fabrication shop / projects storage including temporary dismantling, cutting, re-welding, supporting, and restoring to correct position all temporarily dismantled members, re-alighment of all adjacent connected members to their correct positions (weight of such adjacent members and temporarily dismantled members not payable), scafolding, staging, tools & tackles, gas cutting, welding, consumables etc all complete.	MT	**62**				
2313	Addition to, alterations in and/or modifiction of "Erection Marks" including cutting of parts, gauging of welds, cutting, grinding, fabrication, welding, drilling holes, straightening, removal of bends, raising to the required level, painting, transportation, return of unutilised steel pieces to the project store, temporarily dismantling, cutting, re-welding, supporting and restoring to correct position of all the temporarily dismantled members, realignment of adjacent connected members (weight of such temporarily dismantled and adjacent members not payable) etc all complete for the following:						
a	In erected position	MT	**21**				
b	In fabrication yard	MT	**45**				
2314	Re-erection of dismantled fabricated structural steel members including carriage of modified "Erection Marks" from the field fabrication shop to erection site, lifting to required posiion, aligning in position, tack welding, final welding and touch up painting including temporary dismantling and re-erection of temporarily dismantled members, cutting, rewelding, supporting and restoring to the correct position of all temporarily dismnatled members, re-alignment of adjacent connected members(weight of such temporarily dismantled members and adjacent members not payable), scafolding, staging, tools & tackles, gas cutting, welding, consumables etc all complete.	MT	**52**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A2316	Supply, fabrication and erection of minimum 6 mm thick stainless steel liner of grade SS 316 L; Finish Grade 2B (Cold rolled, Annealed & Pickled and Skin passed) on M.S. plate for inside surfaces of hopper & mouth of hopper of bunkers including fixing with stainless steel studs, bolting (including countersunk), welding with electrode classification E308L for welding of stainless steel to stainless steel and E309 for stainless steel to mild steel etc. all complete.	MT	**198**				
2317	Providing and fixing in position PTFE type sliding bearings of reputed manufacturer, individual bearing suitable for required vertical loads as per the construction drawings and for maximum displacement of ±50 mm including all taxes, duties, transportation, installation, drilling, bolting, erecting, aligning etc all complete for following vertical loads.						
a	20 Tons	EACH	**5**				
b	25 Tons	EACH	**5**				
c	40 Tons	EACH	**16**				
d	50 Tons	EACH	**4**				
e	60 Tons	EACH	**20**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2318	Providing and fixing flexible open ended bellow strap of neoprene of minimum thickness 2 mm and minimum width 200 mm with aluminium stripped edges as sealing below top of bunker and bottom of tripper floor to avoid the coal dust nuisance all complete.	RM	**720**				
A2319	Supply, fabrication and fixing of stainless steel hand railing including transportation, loading/unloading etc. all complete as per specification.	MT	**18**				
A2320	Supply, fabrication and fixing of GI pipe hand railing (1000 mm high) of 32 mm/40 mm/50 mm dia (Medium Grade) including transportation, loading/unloading, painting etc. all complete..	MT	**72**				
2321	Conducting radiography test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	**194**				
2322	Conducting ultasonic test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	**144**				
2323	Conducting ultasonic test on steel plates as per ASTM-A435 or equivalent wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	SQM	**144**				
2324	Conducting magnetic particle test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	**144**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2325	Conducting dye penetration test on welds wherever specified by the engineer including provision of necessary equipments, measuring devices, gauges etc. all complete (over and above the work already specified in the specifications.)	RM	**404**				
	ROAD WORKS						
	Providing Road Work including necessary material, labour, machinery, transportation etc as per specification, drawing, relevant IRC & IS codes and as directed by the Engineer-in-charge for the following.						
2401	Preparation of sub grade by excavating earth to required depth for all types of soil/ash, dressing to camber and consolidating the base including making good the undulation etc and disposal of surplus earth within a lead upto 1 km etc. all complete.	CUM	**59000**				
A2402	Supplying and filling with selected good earth of approved quality in layers not exceeding 300 mm loose thickness using borrowed soil (borrowed soil to be arranged by the bidder) and compacted so as to achieve at least 98 % maximum dry density as per IS-2720 (Part-VII) including royalty/seignorage fee (if any), sorting, spreading, breaking clods, watering, ramming/compaction by manual/mechanical means, dressing, finishing to required lines, grades and slopes, tesing etc all complete.	CUM	**57600**				
2404	Providing & laying water bound macadam sub base course in layers of required thickness with crushed stone aggregates 90 to 40 mm down size, stone screening & blinding material including screening, sorting, spreading to template & consolidation with road roller including carriage, spreading & consolidation of blinding material moorum etc all complete.	CUM	**13195**				
2405	Providing & laying water bound macadam base course in layers of required thickness with stone aggregate 63mm to 40mm size, stone screening and blinding material including screening sorting, spreading to template and consolidation with road roller including carriage, spreading and consolidation of blinding material moorum etc all complete.	CUM	**8797**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2412	Supplying and laying 400mmx100mmx375mm deep precast concrete kerb stone of grade M-20 with 20 mm nominal size stone aggregate and of shape as per detailed drawing including fixing with cement mortar (1:2) in 13mm thick joints, finishing of joints with neat cement paste, making drainage opening where required etc all complete.	RM	**29700**				
2413	Providing & laying edge protection on both edges of black topping using brick on edge (bricks with crushing strength of 75 kg/cm2) with full brick width (230 mm) etc all complete.	RM	**11790**				
A2414	Supply and laying 150mm dia R.C.C NP-3 type Hume pipe in raised shoulders as rain water drains as per detailed drawing including fixing with cement mortar (1:2) in 13mm thick joints, finishing of joints with neat cement paste etc all complete.	RM	**4445**				
2415	Providing and fixing PVC pipes in cable duct banks, openings in RCC work at all elevations of following sizes including cutting, fixing and levelling in position as per drawings, specifications all complete.						
	l) 100 mm dia	RM	**2017**				
	ii) 150 mm dia	RM	**2017**				
	iii) 200 mm dia	RM	**2017**				
	Providing and placing concrete work including cost of labour, materials and equipment for handling, transportation, batching, mixing, placing, vibrating, shuttering, formwork and curing (excluding cost of reinforcement), with mechanised equipments like batching plant, transit mixer, concrete pump etc. complete as per drawing, specification and as per direction of engineer in charge for the following.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2418	Providing and laying of plain cement concrete of grade M15 using 40 mm graded stone aggregate including providing and fixing formwork, compaction etc. all complete	CUM	**7350**				
A2418	Providing and laying of plain cement concrete of grade M20 using 40 mm graded stone aggregate including providing and fixing formwork, compaction etc. all complete	CUM	**3518**				
2419	Providing and laying cement concrete of grade M30 using 20 mm nominal size stone aggregate with approved admixture (if required), provision for necessary joints including compaction, finishing to lines and grades, curing and providing & fixing forwork etc. all complete. (Excluding the cost of reinforcement and dowel bar)	CUM	**18412**				
	REINFORCEMENT						
2421	Providing and fixing in position MS dowel bar reinforcement including surface painted with bitumen and greasing, dowel end caps with cotton fills etc all complete as per specification, drawing and as directed by Engineer.	MT	**66**				
	MISCELLANEOUS						
A2424	Supplying and installation of Dura board HD100 or its equivalent as approved by the Engineer, as filler material in joints including nailing, installation as per manufacturer's recommendation etc. all complete.						
b	20 mm wide joints.	RM	**1250**				
2425	Providing and filling in position hot applied bitumen sealing compund (Grade A) of specified thick confirming to IS 1834 including cleaning, mixing, heating, pouring/injecting sealing compound in gaps in joints, sealant primer etc all complete as per specification, drawing and as directed by Engineer.	RM	**38632**				

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Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
A2427	Providing & laying 80 mm thick M20 Grade precast interlocking concrete pavers of approved colour and pattern as per specification and recommendation of manufacturer.	SQM	**22125**				
B2427	Providing & laying 60 mm thick M20 Grade precast interlocking concrete pavers of approved colour and pattern as per specification and recommendation of manufacturer.	SQM	**22125**				
A2428	Providing and laying 100mm thick sand layer below concrete pavers including compaction etc all complete as per specification, drawing and as directed by Engineer.	SQM	**44250**				
2429	Providing and laying Impermeable plastic sheeting 125 microns thick laid flat without creases as per IRC 15-2002 etc all complete as per specification, drawing and as directed by Engineer.	SQM	**73650**				
2430	Providing and laying Inverted Choke with 25 mm course of screenings (Grading-B) over prepared subgrade including compaction etc all complete as per specification, drawing and as directed by Engineer.	CUM	**2200**				
2500	**PILING**						
2501	Mobilisation of hydraulic rotary piling rigs (applicable to ST No 2503) and accessories capable of pile boring/drilling in all types of strata/installing various size of bored cast in situ RCC piles to project site and demobilisation of the same after completion of piling works etc all complete.	Each	**6**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2502	Mobilisation of Driven cast in situ RCC piling rigs (applicable to ST No 2503A) and accessories capable of installing 550mm diameter piles in all types of soil to project site and demobilisation of the same after completion of piling works etc all complete.	Each	**6**				
2503	Installation of Bored cast-in-situ RCC vertical pile as per IS 2911 (Part 1 Sec 2) with diameter and length as specified (length to be measured from pile cut-off level to the bottom of pile) using cement concrete grade M30 conforming to IS:456 with 20 mm nominal size stone aggregates with a minimum cement content of 400Kg per cum of concrete including providing all materials (but excluding reinforcement steel for which measurement/payment shall be made separately), boring/drilling in all types of soil, providing bentonite slurry and/or casing for stabilization of pile bore, flushing of pile bore, cleaning, providing plasticizer wherever required, breaking pile head to cut off level and exposing pile reinforcement for embedment in pile cap etc including empty boring from ground level to pile cutoff level etc all complete as per specification, drawing and as directed by the engineer-in-charge for the following.						
Ad	Pile with 600 mm diameter and 25 m length below cut off level	Each	**1240**				
e	Pile with 760 mm diameter and 25 m length below cut off level	Each	**2681**				
2503A	Installation of driven cast-in-situ RCC vertical pile as per IS 2911 (Part 1, Sec. 1) by driving a suitable MS casing pipe (removable) having detachable MS shoe (flat/conical) at the bottom and driving using atleast 5 MT hammer for the length as specified (length to be measured from pile cut-off level to the bottom of pile)/for the desired set criteria (to be finalised during contract stage) so as to achieve the desired design load carrying capacity using cement concrete grade M30 conforming to IS:456 with 20 mm nominal size stone aggregates with a minimum cement content of 400Kg per cum of concrete including providing all materials (but excluding reinforcement steel for which measurement/payment shall be made separately), providing plasticiser wherever required, breaking pile head to cut off level and exposing pile reinforcement for embedment in pile cap, empty driving etc including providing approved MS shoe(design and drawing of MS shoe shall be submitted by bidder for approval without extra cost to BHEL/Owner) etc all complete as per specification, drawing and as directed by the engineer-in-charge for the following.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
Aa	Pile with 550 mm diameter and 20 m length below cut off level	Each	**4146**				
2504	Extra over ST. No. 2503 for pile length more than the specified length of 25m below cut off level for the following.						
c	For 600 mm diameter pile	Rm	**2240**				
d	For 760 mm diameter pile	Rm	**2681**				
2504A	Extra over ST. No. 2503A for pile length more than the specified length of 20m below cut off level for the following.						
b	For 550 mm diameter pile	Rm	**4146**				
2505	Rebate on ST.No.2503 for pile length less than the specified length of 25m below cut off level for the following.						
c	For 600 mm diameter pile	Rm	**740**				
d	For 760 mm diameter pile	Rm	**2681**				
2505A	Rebate on ST.No.2503A for pile length less than the specified length of 20m below cut off level for the following.						
b	For 550 mm diameter pile	Rm	**4146**				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2508	Conducting routine load test on single job pile as specified in accordance with IS 2911 (Part-4) including preparation of pile head for testing, necessary excavation, providing all arrangements of loading, unloading, test equipments/accessories, jacks, recording of results, labour, submission of test report etc but excuding the cost of installation of job pile complete as per specification, drawing and as directed by the engineer-in-charge for the following.						
a	**For vertical compression test by maintained load method**						
ii	550 mm diameter pile	Each	**62**				
iii	600 mm diameter pile	Each	**11**				
iv	760 mm diameter pile	Each	**40**				
b	For lateral load test						
ii	550 mm diameter pile	Each	**62**				
iii	600 mm diameter pile	Each	**11**				
iv	760 mm diameter pile	Each	**40**				
c	**For tension/uplift test**						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
ii	550 mm diameter pile	Each	**62**				
iii	600 mm diameter pile	Each	**11**				
iv	760 mm diameter pile	Each	**40**				
2509	Carrying out low strain pile integrity test on 600mm/760mm diameter pile including all arrangements for test, equipments/accessories, materials, labour, submission of test report etc but excluding the cost of installation of job pile all complete as per specification and as directed by the engineer-in-charge.	Each	**3421**				
2512	Driving a 550mm diameter empty MS casing pipe with bottom closed with approved detachable MS shoe down to a maximum depth of 30m below ground level using at least 5MTweigh drop hammer and furnishing the set calculation to establish a safe load carrying capacity in vertical compression including providing detachable MS shoe etc all complete	Each	**18**				
2513	Conducting Dynamic cone penetration Test at specified locations as per IS-4968,Part-II for a maximum depth up to 28m below ground level and submission of approved test report etc as per specification. The rate shall include mobilization of necessary testing equipments etc to the project site and demobilization of same after completion of tests.	EACH	**210**				
2514	Conducting Dynamic cone penetration Test at specified locations as per IS-4968,Part-II for a maximum depth greater than 28m and up to 32m below ground level and submission of approved test report etc as per specification. The rate shall include mobilization of necessary testing equipments etc to the project site and demobilization of same after completion of tests.	EACH	**150**				

ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
2515	Conducting Dynamic cone penetration Test at specified locations as per IS-4968,Part-II for a maximum depth greater than 32m and up to 35m below ground level and submission of approved test report etc as per specification. The rate shall include mobilization of necessary testing equipments etc to the project site and demobilization of same after completion of tests.	EACH	**10**				
2600	Levelling and Grading						
2601	Earth work in stripping of top soil upto a maximum depth of 0.20m below ground level so as to exclude all debris, grass, vegetation, bushes, trees having girth upto 300mm including roots and organic materials etc for leveling and grading including dressing to specified levels & grades and compacting the graded/stripped surface by manual/mechanical means, disposal of stripped materials within a lead upto 1km etc all complete as per specification, drawing and as directed by the engineer-in-charge.	Sq.m	**240666**				
2602	Earth work in filling upto any depth below ground level for grading to proper grade and level in layers not exceeding 300 mm loose thickness with approved good quality murrum (murrum is a borrowed material to be arranged by the bidder) and compacted as specified including supplying murram, royalty/seignorage fee (if any), sorting, spreading, breaking clods, watering, ramming/compaction by manual/mechanical means, dressing, finishing to required lines, grades and slopes, tesing, all lead and lifts etc all complete as per specification, drawing and as directed by the engineer for the following. Rate to include compaction of ground before starting filling using road roller of 12 T.						
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VIII)	CUM	**650000**				
2603	Extra over ST No.2601 for carriage of unserviceable material/earth for every 1 km or part thereof beyond an initial lead of 1km.	Cum	**48133**				
	MISCELLANEOUS						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 2 - Main Palnt Civil, Structural and Architectural Work, Piling and Levelling and Grading							
ST. NO	DESCRIPTION OF ITEM	UNIT	Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
E1	Consolidation of subgrade/ existing surface with 12 T power roller or vibromax including dozing of dumped ash/earth and making good the undulations with ash and rerolling the subgrade for road, hard surfacing of equipment store, fabrication yard, assembly yard etc as directed by BHEL.	SQM	**50000**				
E2	Providing and laying stone for making erection roads, hard surfacing etc with specified sizes of approved quality hard rock rubble or hand broken hard metal of sizes ranging from 100mm to 150mm, etc in one layers approximately 200mm total thickness including moorum after compaction, hand packing, filling in interstices with quarry spalls/ moorum and providing a morrum layer of 25mm thickness (consolidated) including watering, thoroughly compacting layer with 12 tonne power roller or vibromax with minimum 8 passes etc all as per the direction of the engineer and as per specification.	CUM	**1000**				
E3	Spreading and laying available ash/earth in layers, levelling,compacting with Vibromax or suitable equipment for making it fit to receive a layer of moorum or placement of plates for movement of cranes/heavily loaded trailor etc.	CUM	**1000**				
E4	Providing and fixing Green Net over erected structure to prevent ingress of ash dust in designated areas. (frame work shall be paid in respective item)	SQM	**1000**				
	TOTAL						

SIGNATURE OF BIDDER

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
1	Earth work in excavation in all types of soil including moorum, ash which can be excavated by any means including setting out, levelling, dewatering (but excluding special type of dewatering viz. well point method), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 500 m, spreading/levelling of disposed materials etc all complete for following depths below ground level including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge						
a	Depth from ground level but not exceeding 2 m	cum	7545				
b	Depth exceeding 2 m but not exceeding 4 m	cum	6700				
c	Depth exceeding 4 m but not exceeding 6 m	cum	5910				
d	Depth exceeding 6 m but not exceeding 8 m	cum	1625				
2	Extra over Item No. 1 for dewatering of ground water by well point method as per IS 9759.	cum	7500				
7	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with selected materials from compulsorily excavated soil & ash available within a lead upto 500m and compacted as specified including re-excavation of stacked earth, watering, ramming/compaction by manual/mechanical means, dressing etc all complete.for the following including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	DESCRIPTION OF ITEM	UNIT	otal Quantit	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	cum	5730				
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	200				
c	Each layer compacted so as to achieve at least 85% maximum dry density as per IS-2720 (Part-VII)	cum	200				
8	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with selected materials directly from excavation and compacted as specified including watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.						
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	cum	500				
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	100				
9	Extra over item No. 1 and 3 to 7 for carriage of excavated earth/selected materials for every 1 km or part thereof beyond an initial lead of 500m.	cum	14765				
10	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with approved borrowed soil (borrowed soil/ morrum to be arranged by the bidder) and compacted as specified including supplying borrowed soil, royalty (if any), watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	cum	1800				
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	200				
c	Each layer compacted so as to achieve at least 85% maximum dry density as per IS-2720 (Part-VII)	cum	200				
11	Supplying and filling sand upto any depth below grade slab, around foundations, etc. in layers not exceeding 250 mm thickness and compacted so as to achieve at least 80% relative density as per IS-2720 (Part-XIV) including spreading, watering, ramming/compaction by manual / mechanical means, dressing, royalty (if any) etc. all complete including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer-in-charge.	cum	395				
12	Supplying and laying (inside chimney in the space below the grade level slab) crushed rock (63mm down graded) and sand fill in layers no more than 150 mm thick each and thoroughly compacted by compacting equipment and by water flooding to achieve maximum density for all leads and lifts including all labour, materials, equipment etc. complete as per drawings, specifications and directions of the Engineer.	cum	650				
13	Providing and laying Nominal Mix plain cement concrete (1:3:6) with graded aggregate (with maximum size of coarse aggregate not exceeding 40 mm) at all levels for all kinds of work like mass concrete, lean concrete, mudmat, filling etc. including labour, materials, equipment, handling, transporting, batching, curing, testing etc. all complete as per specifications, drawings and instructions of the Engineer.	cum	335				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
14	Providing and laying design mix cement concrete with graded aggregate (maximum size of coarse aggregate not exceeding 20 mm) for reinforced concrete work at all levels for all kinds of work, including labour, materials, equipment, handling, transporting, batching, mixing, placing, levelling, compacting, curing, testing etc. and rendering or cleaning and finishing the exposed surface with cement mortar (1:3) to give smooth and even surface, all complete as per specifications, drawings and instructions of the Engineer, but excluding all formwork and reinforcing steel:						
i	For all works below ground level (except chimney shell)						
b	Grade M-30 (foundations, etc)	cum	12900				
ia	Extra over St. No. 14(i) for controlling of temperature of fresh concrete for raft/pilecap to less than 23 degree centigrade using ice, including all related arrangements for providing, storing and mixing of ice with water, cooling of aggregates etc. All complete as per specification, drawing and instruction of engineer in charge.	CUM	6450				
ii	For all other works						
a	Grade M-20 (grade level slab)	cum	120				
b	Grade M-30 for chimney shell, corbels and external platforms and other shell attachments.	cum	155				
c	Grade M-35 for chimney shell, corbels and external platforms and other shell attachments.	cum	15890				
d	Grade M-25 for all other components of the super structure, roof slab, mini - shells, beams, columns wall etc.	cum	20				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
15	Providing and applying two coats of bitumen grade 85/25 as per IS 702 (@ 1.7kg/sqm) with 1% antistripping compound conforming to IS 6241 in foundation, shell, pedestal etc on concrete surfaces exposed to soil / ash including surface preparation etc. all complete.	Sqm	2930				
16	Providing and placing reinforcement, for reinforced concrete work, at all levels, for all kinds of work, including transportation, cleaning, derusting, straightening, cutting, bending, binding in position with annealed wire and/or welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement, etc. with all materials, labour, equipment, handling, transporting, testing, etc. preparation of bar bending schedules, all complete as per specifications, drawings and instructions of the Engineer.						
i	For all works below ground level (except chimney shell)						
a	High strength deformed bars	Mt	1450				
ii	For all other works						
a	Mild steel reinforcement bars	Mt	100				
b	High strength deformed bars	Mt	1550				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
16 (a)	Extra over ST No.16 for providing fusion bonded epoxy coating by mechanised & qualified process including blast cleaning to white metal as per Swedish code, heating in induction heater, electrostatically spraying the epoxy powder, complete fusion to give minimum coating thickness of 200-300 microns, gradual cooling without affecting the properties of steel, testing as per ASTM 775 and IS:13620, flexiblity & holiday test, proper packing, safe transportation, touchup at site, etc. complete to ensure proper resistance of FBE against corrosive enviornment including transport of the steel from BHEL site store to vendor plant and bringing back to site and special handling during straightening, cutting, bending, placing and providing PVC coated binding wire.						
i	For all works below ground level (except chimney shell)						
a	High strength deformed bars	Mt	1450				
ii	For all other works						
a	Mild steel reinforcement bars	Mt	100				
b	High strength deformed bars	Mt	1550				
17	Providing and fixing formwork of approved quality for cast-in-situ, plain or reinforced concrete works of any type and section (including curved surfaces and chimney shell) for all elevations, including labour, materials, equipment, waste of forms, shoring, strutting, scaffolding, staging, tieing, nailing, caulking, bolting etc. and removal of form work and staging etc. all complete as per specifications, drawings and instructions of the Engineer.						
	For all works below ground level (except chimney shell)	Sqm	3165				

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ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
	For all other works						
a	Inner and outer faces of wind shield with slip form shuttering	Sqm	39265				
b	All other components of the superstructure including slabs, beams, columns, walls, enclosures, mini shells, external platforms, corbels, other shell attachments, chases/recesses in shell etc.	Sqm	930				
18	Providing and fixing formwork in shell openings (above 0.1 sq.m surface area) including cutting, formation of shapes and all other operations required for making the required shape and size, removal of formwork, all complete as per specifications, drawings and instructions of the Engineer.	Sqm	150				
19	Providing and placing in position at all levels, building paper (kraft paper), as per IS:1397, between concrete surfaces incluing the cost of labour, material, etc. complete as per drawings and instruction of the Engineer.	Sqm	80				
20(A)	Supplying and installation of Dura board HD100 or its equivalent as approved by the Engineer, as filler material in joints including nailing, installation as per manufacturer's recommendation etc. all complete.						
a	12 mm wide joints. SQM	Sqm	40				
21	Providing and filling, at all levels, bitumen sealing compound (hot applied type) conforming to IS:1834, for sealing gaps and joints in concrete, including cleaning, mixing, heating, pouring or injecting, appllication of primer, cost of all labour, material and equipments etc., complete as per drawings, specifications and instructions of the Engineer.	Kg	605				
22	Preparing detailed fabrication drawings and after approval by the Engineer, supplying, fabricating, erecting and installing miscellaneous steel parts to be embedded/cast in concrete (like staircase embedments, corbel face plates, etc) at all positions and levels including the cost of all labour, materials and equipments for setting materials in concrete, grouting, welding, bolts & bolting, expansion anchors, drilling, cutting, etc. complete as per drawings and specification.	Mt	6				

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Package 3 - 275m Height RCC Twin Flue Steel Chimney							
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				(In fig)	(In Words)	(In fig)	(In Words)
23	Preparing detailed fabrication drawings after approval by the Engineer, providing, fabricating and erecting structural steel work for the stair case (from grade level to roof level), internal platforms, walkway gallery structures,chequered plate panels (for floors of internal and external platforms), treads and landings of the staircase including brackets, kick plates, structural members, beam support bearings on the shell, stiffeners, seats, blockouts, ready to bolt fixtures, cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, welding to cast in fixing place, cutting, grinding, drilling, bolts and bolting, anchor fasteners, welding, preheating and post heating for welding , testing, primer and finish painting etc. complete as per drawing and specifications.	Mt	450				
24 (a)	Supplying, fabrication, erection and alignment of factory made galvanised welded grating units with mild steel conforming to IS:2062 in platforms, staircases with edge binding strips and anti-skid nosing in treads etc. including including hot dip galvanisation as per IS:4759, fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	Mt	125				
25	Providing and fixing in positing of high strength structural bolts (of property class 8.8 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	Quintal	50				

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Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
26	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and erecting, at all levels, structural steel flues (liners) ,(Structural steel sections to be used for flue shall be corrosion resistant steel type " COR-TEN–B" having an yield stress 250MPa conforming to IS 2062 (E250) of minimum thickness 10mm unless noted, Top 10m length or length equal to 2 times flue diameter whichever is larger shall be provided using material confirming to AISI:316L or BS:1449), complete with all bends, flanges, stiffeners, all other flue attachments, support system, collars, access manholes and gas sampling ports alongwith gaskets and other accessories, staying system, including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, cutting, grinding, drillings, bending, bolts and bolting, welding, preheating and post-heating for welding, testing, etc. complete as per drawings and specifications.	Mt	1275				
27	Providing, fabricating and installing at various locations and elevations of the chimney system the following miscellaneous mild steel items complete with the cost of all labour, material and equipment, transporting, lifting, setting in place, cutting, grinding, drilling, welding, bolts and bolting, anchor fasteners and anchoring, priming, painting, grouting etc. complete as per drawings and specifications:						
a	Mild steel ladders with cage, hood access hatch, louvers, bird screens, hood drain basin covers and other miscellaneous mild steel items not specifically mentioned.	Mt	17				
b	32/40 mm nominal bore medium class tubular hand railing for stair case and internal and external platforms.	Mt	41				
c	Providing minimum 275 gsm Hot dipped galvanisation on mild steel parts as per specification.	Mt	5				
d	Providing Hot dipped galvanisation on mild steel parts as per specification/IS: 4759.	Mt	55				

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				(In fig)	(In Words)	(In fig)	(In Words)
28	Preparing detailed fabrication drawings after approval by the Engineer, providing, fabricating and erecting, at all levels, mild steel strakes complete with all stiffeners, attachments, fasteners, pipe sleeves, etc. including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, embedding components in concrete, fixing to cast-in embedments, cutting, grinding, drilling, bolts and bolting, welding, preheating and post heating for welding , testing, grouting, primer and finish painting of exposed components, etc. complete as per drawing and specifications.	Mt	25				
29	Supplying, fabricating and installing in the liners, gas sampling and gas oapacity measurement ports made from SS grade 316L pipe including the cost of all labour, materials, bolts and bolting, asbestos gaskets, cover plates & all other accessories, painting etc., complete as per drawings and specifications.	Each	10				
30	Preparing detailed fabrication drawings after approval by the Engineer, providing, fabricating and erecting, at all levels SS Mini Shell at roof shell of grade A316L , etc. complete as per drawing and specifications.	Mt	32				
31	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and installing at all levels, stainless plates (including stainless steel screws and fasteners) of grade AISI 316Land lead sheets beams and over the mild steel in the platform beam bearing, flue supports bearings, flue restraints brackets/ buffers etc. including the cost of all labour material & equipment, transporting, lifting to all heights, setting in place, cutting, grinding, drilling, welding of stainless steel using compatible & approved stainless steel electrodes, testing & machining flat and polishing the contact surfaces of stainless steel, coating the polished surfaces with silicone grease, etc., complete as per drawings and specifications.						
a	Stainless steel components.	Mt	0.24				
b	Lead Sheets.	Kg	80				

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				(In fig)	(In Words)	(In fig)	(In Words)
32	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and installing expansion compensator joints including bolster in the flue liner including all labour, material and equipment transporting, hoisting, fixing in position, drilling, cutting, bolts and bolting, etc. along with the user handbooks (giving details of installation, dismantling and maintainance procedures for the expansion joints), testing, etc complete as per drawings and specifications.	Sqm	160				
33	Supplying ,Fabricated Ready to Install, spare expansion compensators alongwith bolster including the cost of all labour, material and equipment, accessories, transporting, proper packaging (for several years of storage), and delivery to site store complete in all respects as per drawings and specification.	Sqm	45				
34	Supplying and laying in position shaped acid resisting bricks conforming to class - I of IS:4860 at all elevations for liner, baffle wall construction (with sloped A/R mortar toppings over brick work) complete including the cost,of all labour, material and equipment, raking joints, flush pointing, cleaning, curing, etc. complete as per drawings and specifications.	Cum	25				
35	Supplying and laying in position shaped fire bricks conforming to IS-6 group A at all elevations for liner, baffle wall construction (with sloped A/R mortar toppings over brick work) complete including the cost,of all labour, material and equipment, raking joints, flush pointing, cleaning, curing, etc. complete as per drawings and specifications.	Cum	25				
37 (a)	Supplying, and placing in position Load bearing insulation assembly including (i) a properly machined mild steel plate with recess at its top for seating PTFE (Poly Tetra Fluoro Ethylene) sheets conforming to BS:5400 (ii) saddle plate (MS) in the middle having stainless steel plate fixed at its bottom surface and lead / elastomeric sheet at top, and (iii) top late formed of two numbers insulation blocks each made of minimum 50 mm thick rigid, non-combustible asbestos fibre reinforced lime-silica board (SINDANYO BLOCKS NATURAL GRADE CS-51) or equivalent bonded to mild steel plates at top and bottom. For side restraints assembly of insulation blocks of SINDANYO Natural Grade CS-51 or equivalent and stainless steel plate shall be used. All stainless steel in these assemblies shall conform to AISI-316L and mild steel to IS:2062. SINDANYO BLOCKS or equivalent shall be suitable for operation at 320oC and shall primarily satisfy the following physical properties: i) Minimum compressive stress prior to onset of compression yield of not less than 12 N/sq.mm. ii) Minimum shear strength of 30 N/sq.mm when tested in accordance with BS:3497-1979. iii) Thermal conductivity shall not exceed 0.67 W/m Deg.C at a mean temperature of 200oC and its coeff. of linear expansion not to exceed 1.2x10-5 per Deg.C. iv) Adhesive used for bonding purposes shall be of material with equivalent high temperature properties as approved Foundation Engineer. It may be of "Fortafix	Nos.	64				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
38	Supplying and laying vermiculite concrete in the liner basin including the cost of all labour, material and equipment for handling, transporting, mixing, lifting, placing, curing, finishing of surface etc. complete as per drawings and specifications.	Cum	5				
42	Supplying and installing ready mix castable refractory concrete at opening of chimney shell baffle wall and at other locations including all necessary arrangement for keeping them in position as per drawings and approval of Engineer.	Cum	5				
44	Providing, fabricating and laying in position asbestos mill boards, over the mini shells below the cast iron cap segments, in between the cap segments and wherever as directed by the engineer, including the cost of all labours, material and equipment, cutting, drilling, etc., complete as per drawings and specifications.						
a	25 mm thick asbestos mill boards.	Sqm	15				
46	Providing and installing, at all levels,resin bonded glass wool insulation slabs of density not less than 64 kg/m3 with an installed thickness of not less than 100 mm, on the outside surface of steel flue liners,on the outside surface of brick liner, on the inside surface of concrete windshield, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 50 mm thick) including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	4050				

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Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
46 (a)	Providing and installing, at all levels,resin bonded glass wool insulation slabs of density not less than 64 kg/m3 with an installed thickness of not less than 50 mm, on the outside surface of steel flue liners,on the outside surface of brick liner, on the inside surface of concrete windshield, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 25 mm thick) including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	2030				
47	Providing and installing, at all levels, resin bonded rock wool insulation slabs of density not less than 100 kg/cu.m with an installed thickness of not less than 100 mm, on the outside surface of steel flue liners,on the outside surface of brick liner, on the inside surface of concrete windshield, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 50 mm thick) including the cost of all labour, material and equipment, transporting, lifting	Sqm	4050				
47 (a)	Providing and installing, at all levels, resin bonded rock wool insulation slabs of density not less than 100 kg/cu.m with an installed thickness of not less than 50 mm, on the outside surface of steel flue liners,on the outside surface of brick liner, on the inside surface of concrete windshield, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 25 mm thick) including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	2030				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
47 ©	Providing and installing, for the exposed portion of flue at the top,the insulation material, having a minimum density of 200 kg/cum, consisting of 6 layers of insulation material each of a minimum thickness of 25 mm and all joints shall be staggered, wherever as directed by the Engineer, including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	500				
48	Providing and packing, at all levels, loose glass wool insulation to a density not less than 64 kg/m3 between the insulated minishells and brick liners at expan joints between the lining segments and wherever as directed by the Engneer including the cost of all labour, material and equipment, filling, ramming, testing, etc. complete as per drawings and specifications.	Cum	5				
49	Providing and packing, at all levels, loose rock wool insulation to a density not less than 100 kg/cu.m between the insulated minishells and brick liners at expanjoints between the lining segments and wherever as directed by the Engneer including the cost of all labour, material and equipment, filling, ramming, testing, etc. complete as per drawings and specifications.	Cum	5				
50	Providing and painting, at all levels, inside surface of chimney shell, inside and outside surfaces of minishells, underside of roof slab and other concrete components/surfaces of the chimney as indicated in the drawings and wherever as directed by the Engineer, with acid and heat resisting black bituminous paint (conforming to type I(i) of IS:158) in as many number of coats (not less than four coats in any case) as required to give a paint DFT of not less than 150 microns including the cost of all labour, materials, equipment, surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specifications.	Sqm	19250				
53	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with synthetic enamel paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all labours, material and & equipment,surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification.	Sqm	16450				

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP							
Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
54	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with acid and heat resistant polyurethane paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all labours, material and & equipment surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification.	Sqm	3750				
55	Proving and laying over the chimney roof, a comosite acid and heat protection treatment including providing of slopes for roof drainage including the cost of all labour, material and equipment, etc., complete as required for preparing the roof concrete, laying under bed of plain cement concrete screed to slopes, preparation of screed surface for painting, painting the screed surface with black bituminous paint, applying bitumenmastic in layers, laying acid resisting(A/R) mortar bed and laying 75 mm thick acid resisting(A/R) bricks with A/R mortar, curing, pointing(with phenolic based A/R cement), protection and cleaning, finishing, etc., complete as per drawing and specifications.	Sqm	270				
56	Providing, fitting& fixing, outlet and overflow, cast iron roof drain heads (with gratings) in chimney roof including sockets, adapters, brackets, hangers, supports, etc., casting-in and jointing to 150 mm nominal bore rainwater pipes, grouting, etc. including the cost of all labour material and equipement, transporting, lifting, setting in place, painting, etc. complete as per drawing and specifications.	Each	8				
57	Providing, fitting and fixing rainwater pipes at all levels internally from the chimney roof to ground level upto the hood drain basin including shoes, bends, junctions, flanges,hoppers, sockets, adaptors, brackets, hangers, supports, anchor fasteners, spacers, pipe sleeve through shell, silicon or vulcanised butyl seaant, foam backing material, jointing, socketing, grouting, caulking, primer and finish painting etc. complete including the cost of all labour, material and equipment, complete as per drawing and specifications:						
a	150 mm nominal bore cast iron pipes.	Rm	25				
b	150 mm nominal bore medium class galvanised mild steel pipes.	Rm	550				
c	150 mm nominal bore UPVC.	Rm	25				

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Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	DESCRIPTION OF ITEM	UNIT	otal Quantit	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
58	Providing and laying 50 mm thick cement concrete flooring (comprising of 12 mm thick non-mettallic concrete hardener topping over 38 mm thick under bed of concrete) over the grade level slab inside the chimney, including the cost of all labour, material and equipment, etc. complete as required for preparation of base, laying underbed and topping, finishing, rounding of edges, corners and junctions, curing, testing, etc. complete as per drawing and specifications.	Sqm	790				
59	Providing and installing an electrically operated grill type steel roll-up door (with the bottom 0.5 metres of the curtain in solid type) at chimney base, in opening of size 7.8 m by 7.1 m, with all hardware and mechanisms, fittings and fixtures, locking arrangements, frames, fasteners, gear handle arrangement for standby manual operation, all electrical accessories such as motors, control systems, cables, etc. including the cost of all labour, material and equipment, fixing in position, grouting primer and finish painting, testing, etc., complete as per drawing and specifications.	Each	1				
60	Providing and installing at any level and location, mild steel, double plate, personnel access doors, in shell openings of size 1.1m by 2.15m, complete with all fittings and fixtures, locking arrangements, frames, fasteners including the cost all labour, material and equipment, lifting to all heights, setting in place, grouting primer and finish painting, etc., complete as per drawing and specifications.	Each	7				
61	Supply, fabricating and fixing of cleanout door of size 650X825 mm. The door should be solid steel construction with inner plate 8mm and outer plate 6mm with suitable infill of stiffners, & filled with insulation mateterial and all other fittings, fixtures, fasteners including the cost of painting etc complete as per drawings and specification. The door should be hinged type and providing with locking device in addition to swivel studs with wing nuts on remaining 3 edges. The should be openable both from inside & outside and removable insulation to be provided around door opening. The door shall be provided with a minimum two coats of acid & alkali resistant paint confirming to IS158 type-I to give a DFT of 75microns. The outside surface shall be provided with minimum 2 coats of Zinc redoxide primer and two coats of synthetic enamil paint.	Each	2				

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Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
63	Supplying, fabricating and installing mild steel/Stainless steel hatches at various locations in the chimney system complete with locking arrangements, frames, insulation, fittings and fixtures and all mechanisms and accessories reqd. for proper operation including all labour, painting etc. complete as per drawings and specifications.						
a	Hood Access Hatch	Each	1				
c	Liner Access Hatch	Each	2				
64	Conducting load testing on girders for 1.25 times the full load, on ground , including provision of test bed and jacks, dial gauges and other supplies complete as per specification and drawings and approval of engineer in-charge.	Pair	2				
65	Designing, supplying, fabricating and installing after approval by the Engineer, non-metalic expansion joints to seal gaps between chimney components and to meet the service requirements as given in the specifications alongwith the cost of all components of the expansion joint, insulation, galvanised bolts, nuts, washers, anchor fasteners and retaining bars, packing materials and reinforcements at the connecting ends and flanges, lapping etc. including preparation of brick surface (to be connected to the expansion joint) with potassium silicate resisting mortar for proper leak tight bearing surface, with the cost of all labour and equipment, user hand books (giving details of installation, dismantling and maintenance procedures for the expansion joints) etc. complete as per drawings and specifications for:						
a	Expansion joint between ducts and liners.(2 Nos.)	Sqm	20				
66	Supplying and erecting after approval by Engineer an Elevator from ground upto top of chimney with landing at various platform level complete as per spec. and drawings.	Lumpsum	1				
	ELECTRICAL ITEM FOR THE BOQ						
E1	415V, 200A, 50 KA for 0.25 sec, 4 wire AC Distribution Board with 1No. incomer (SFU) & 9 nos. of 100A (TPN) outgoing complete in all respects	No.	1				

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				(In fig)	(In Words)	(In fig)	(In Words)
E2	415V, 200A, 4 wire AC Emergency Lighting distribution board alongwith 50KVA lighting transformer (415/433 V, Dyn11, Z=4%, ±2x2.5% Off Ckt. Tap) with 2 nos. of incomers with auto changeover facility using contacts and 6 nos. 100A SFU (TPN) outgoings complete in all respectsIn case load requirement of chimney can not be met by 50 kVA lighting transformer after considering loading of 80 to 85%, 100 kVA lighting transformer shall be provided alongwith suitably rated components without any commercial implications to the purchaser.	No.	1				
E3	Normal AC lighting panel outdoor type with degree of protection IP 65 with one no. 100A SFU (TPN) Incomer , 18 outgoing (16A SP MCBs)	No.	3				
E4	Emergency lighting panel outdoor type with degree of protection IP 65 with One no. of 100A TPN/SFU incomer and 12 outgoings (16A, SP MCBs)	No.	3				
E5	Aviation lighting panel outdoor type with degree of protection IP 65 with one no. 100A SFU (TPN) Incomer , 8 outgoing 32A SFU (TPN), photodetector and timer circuit along with 100A contactor to control aviation lighting system.	No.	1				
E6	Aviation obstruction lights :						
a)	GEC Cat. No. ZA750(L) NEON WITH minimum 20 years maintenance free life.(Low intensity (Multi LED type- B as per ICAO)	No.	16				
b)	Medium intensity flashing RED light as per ICAO standard having intensity of 2000 to 20,000 candles depending upon background illuminance & flashing frequency 40-60/min with all accessories WITH minimum 20 years maintenance free life (Medium intensity Multi LED type- B as per ICAO)	No.	12				
E7	Aviation Distribution Board (ADB) with one 32A SFU (TPN) incomer and 8 nos. SP 20A MCB. Construction is same as Lighting Panel.	Each	3				
E8	250W metal halide Flood lights with fixtures, lamps and all control gears & accessories	No.	50				
E9	Metal halide Well glass type luminaries with 70W lamp with all controlgears & accessories(Metal Halide fixtures)	No.	110				

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ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
E10	Metal halide Well glass type luminaries with 150W lamp with all controlgears & accessories. (Metal Halide fixtures)	No.	50				
E11	63Amp welding switch socket with plug & other Mounting accessories	No.	8				
E12	3 pin, 1 ph, 240V,15Amp. Power socketscomplete with plug Switches etc.	No.	8				
E13	AL conductor, XLPE insulated, Armoured, ST-2 outer sheath, FRLS type 1100V grade conforming to IS-7098 Part I.						
a.	3½ C x95mm^2 Al for connection between ACDB/ELDB/ welding sockets	Lot as required	1				
b.	3½ Cx35mm^2 Al for Lighting panel incoming supply	Lot as required	1				
c.	4C x16mm2 Al Conductor, XLPE insulated, Armoured, PVC outer sheath, FRLS type 1100V grade conforming to IS-7098 Part I for connection between ALP/ADB/Aviation Lights	Lot as required	1				
E14	PVC insulated 1100V grade stranded Cu Conductor lighting wires conforming to IS-694 for the following.	Lot as required	1				
a)	2.5 mm2	Lot as required	1				
b)	4.0 mm2	Lot as required	1				
E15	GI pipe conduit with minimum 25 mm dia with GI junction boxes, GI pull boxes & accessories etc. complete in all respects.	Lot as required	1				
E16	PVC coated Flexible steel conduit 25mm dia with accessories	Lot as required	1				

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ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
E17	Lightning protection Air terminal : Lead coated copper material of 20mm dia & 2 metre long each.	Lot as required	1				
E18	Electrical equipment earthing materials including down conductors						
a)	Below ground earthing system	Lot as required	1				
b)	Above ground earthing system	Lot as required	1				
E19	16 SWG GI wire for equipment earthing	Lot as required	1				
E20	Test links for down conductors	nos.	4				
E21	Earthpit with earthing electrode including brick chamber with cover, accessories etc. complete in all respect.	nos.	4				
E22	Telephone socket with junction box etc. complete as per drawings & specifications.	Each	10				
E23	Telephone handsets complete as per drawings & specifications.	Each	10				
E24	Telephone cable (minimum 4 pair) of minimum 0.6 mm dia annealed high conductivity electro copper conductor, PVC insulated, twisted, PVC tape wrapped, screened, tip corded, PVC sheathed, confirming to relevant ITD (Indian Telephones department) specification						
a)	24 pairs	Lot as required	1				

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ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
b)	4 pairs	Lot as required	1				
E25	GS cable trays. Cable trays shall be of ladder type constructed of minimum 2 mm thick mild steel hot dip galvanise including cover, cabling material, accessories etc. complete as per drawings & specifications.						
a	600 mm wide	Lot as required	1				
b	300 mm wide	Lot as required	1				
c	150 mm wide	Lot as required	1				
E26	Cable glands & lugs required for cable termination for complete electrical systems of Chimney	Lot as required	1				
Note :	1. Ambient temperature for design of all electrical equipment shall be considered as 55°C for chimney electrical system. 2. Schedule of Equipment has been indicated for reference only. All electrical items shall be supplied on as required basis.						
	MAUX ITEM FOR THE BOQ						
1.0	VENTILATION SYSTEM FOR CHIMNEY						
1.1	Centrifugal fan with casing and support with motor, dry panel type pre-filter & all fittings complete with fixing frame, inlet air louvers, bird sceen, vibration isolators for fans and local isolator control panels, Drive Pulleys, V-belt, belt guards, slide rails, Dampers at fan outlet and flexible connection with matching flanges at fan inlet and outlet, Vibration isolators (cushy foot type/neoprene rubber pad), foundation bolts and nuts etc.	Nos	3				
1.2*	MS DUCTING, DIFFUSER/GRILL WITH EXPOXY PAINT						
a)*	18 G	SQM*	500				

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Package 3 - 275m Height RCC Twin Flue Steel Chimney							
ST. NO	**DESCRIPTION OF ITEM**	**UNIT**	**otal Quantit**	**Rate**		**Amount**	
				(In fig)	(In Words)	(In fig)	(In Words)
b)*	20 G	SQM*	500				
1.3*	MS Grilles with VCD	SQM*	20				
1.4*	Wall mounted dampers (gravity operated) for different areas.	SQM*	10				
1.5*	Inlet Louvres	SQM*	10				
	Total						
NOTE :	The bidder shall furnish unit rates for variable item (marked *) i.e., ducting, supply grilles, diffusers, gravity damper, etc for necessary adjustment (plus or minus) variation during detailed engg. stage. The unit rates quoted above shall be considered and no separate unit rates shall be quoted. Unit rates shall be valid throughout the contract.						

Tender Specification BHEL PSSR SCT 1575 for CIVIL WORKS at 2 x 660 MW ENNORE STP

Package 4 : Cooling Tower

ST. NO	DESCRIPTION OF ITEM	UNIT	Total Quantity	Rate		Amount	
				(In fig)	(In Words)	(In fig)	(In Words)
1	Construction of Natural Draught Cooling Tower including design, manufacture, assembly, inspection and testing at manufacturer's and/or his sub-contractors works, proper packing, delivery at site, transportation, unloading/handling at site, erection, site painting, commissioning, testing of Natural draft cooling tower (NDCT) including electrical, C&I, civil & structural works, as specified & as necessary including PG test for completeness in all respects and for efficient & trouble free operation.	Nos	2				

SIGNATURE OF BIDDER