BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-8-May-20

CORRIGENDUM- 05

PROJECT	**:**	**3X660 MW NPGCPL NABINAGAR STPP (FGD PKG)**
PACKAGE	**:**	**MISC. TANKS(SITE FABRICATED)**
ENQUIRY NO	**:**	PE/PG/NB2/E-6402/2019 **Dated. 05.03.2020**
SUBJECT	**:**	**PRE- BID CLARIFICATION**

Type of Corrigendum			
Technical Corrigendum -	☑	Commercial Corrigendum -	☐

In reference to the above mentioned tender enquiry for **MISC. TANKS(SITE FABRICATED)** package

Please note the following.

1. All bidders are requested to go through the attached pre-bid clarification please.

All the other terms and conditions of the tender enquiry remain unchanged. All the bidders are requested to quote accordingly.

GURU DAS

Digitally signed by GURU DAS
DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, ou=BHEL / PS-PEM- Noida, postalCode=201301, st=Uttar Pradesh, 2.5.4.20=3db2eecbcc63974 22000b9a9249f42f5f61e929 45b626eadf3af7beb0a08b4 53, cn=GURU DAS
Date: 2020.05.08 09:15:32 +05'30'

Yours faithfully,

For and on behalf of BHEL

Guru Das
Dy. Manager

2555/2020/PS-PEM-MAX

MISC. TANKS (SITE FABRICATED) at 3 X 660 MW NPGCPL NABINAGAR STPP (FGD PKG]			Tender No. PE/PG/NB2/E-6402/2019	
Pre Bid Clarifications Reply				
S.No.	**Section/Clause/ Page No.**	**Statement of the referred clause**	**Clarification required**	**BHEL Reply**
1	PE-TS-457-167-A101 Part2 / Cl 1.4 of pg 2	The scope of works shall also include supply and installation of special accessories including agitator supporting arrangements, agitator platform, baffle plates etc. as indicated in FGD Tank schedule(SectionIII, Annexure-8) and GA drawing forMiscellaneous FGD tanks. The necessary fixtures andother accessories for mounting these special accessories shall be inclu ded in the scope of work of the bidder.	Please provide agitator datasheets & weights and also provide the static & dynamic loads. So that we accordingly design and consider its supporting platforms and respective accessories. Also note that baffle plates details are not furnished in the GAD's,provide the same.	For static and dynamic load please refer Annexure -I attached herewith. Further details like data sheet of Agitators shall be furnished during detail engineering. For baffle plate details refer Section-III, Annexure-8 TANK SCHEDULE & GA DRAWING (TYPICAL) WITH AGITATOR PLATFORM AND FIELD QUALITY PLAN (refer annexure-II attached herewith).
2	PE-TS-457-167-A101Part2 / Cl 1.5 of pg 2	Baffle plates for the agitators shall be mounted on the tank. The supply and erection of the baffleplates shall be in bidder's scope of work. The minimum no. of b affle plates and minimum dimension of the baffle plates have been in dicated in the drawing attached with the tank schedule (Section-III, Annexure-8). The final quantity and dimensions of the baffle plates shall be decided during detail engineering.	Please note that baffle plates details are not furnished in the Section-III,Annexure-8, provide the same.	For baffle plate details refer Section-III, Annexure-8 TANK SCHEDULE & GA DRAWING (TYPICAL) WITH AGITATOR PLATFORM AND FIELD QUALITY PLAN (refer annexure-II attached herewith).
3	PE-TS-457-167-A101Part2 / Cl 2.4 of pg 4	Minor civil work like chipping of foundation, groutingbelow base plateforall structures, equipment, grouting of pockets, ex cavation & filling of earth for buried MS pipes if and as required.	Please note that excavation & filling of earth for buried MS pipes are not in our scope	Noted, the excavation & filling of earth for buried MS pipes is excluded from bidder's scope.
4	PE-TS-457-167-A101Part2 / Cl 3.1 of pg 4	Design of roof and roof structures for vertical storage tanks along with agitators & agitator platforms shall be designed based on guidelines given in the book titled "Process equipment design"by Brownell and Young.	Please provide agitator datasheets and weights. Also provide the static and dynamic loads of the agitators	Please refer S.No. 1.
5	PE-TS-457-167-A101Part2 / Cl 3.17 of pg 6	Raw material of fastener must undergo Inter-Granular Corrosion test as per ISO-3651, Part-1 for Nitric Acid test.	Please clariffy	All fasteners used in wetted condition must be of Alloy 926 or better material so that even if it comes in contact with liquid by swelling of rubber, thread remains unaffected. Raw material of such fastener must undergo Inter-Granular Corrosion test as per ISO-3651, Part-1 for Nitric Acid test.
6	PE-TS-457-167-A101Part2 / Cl 3.17 of pg 6	Code conformance for bolts and nuts shall be SA 193 & 194 respectively.	As per drawings the bolts and nuts are given as IS 1367, Please confirm what to be consider.	The code for bolts and nuts shall be IS: 1367 inline with the GA Drawings of the tanks(Section-I, Sub-Section-D, Annexure-III). Further, all fasteners used in wetted condition must be of Alloy 926 or better material so that even if it comes in contact with liquid by swelling of rubber, thread remains unaffected. Raw material of fastener must undergo Inter-Granular Corrosion test as per ISO-3651, Part-1 for Nitric Acid test.
7	PE-TS-457-167-A101Part2 / Cl 3.18 of pg 6	Nozzles are tentative	Please confirm at this stage only.	All the requirements shown under GA drawing are bare minimum, further final sizes, additional quantity and any other additional items if found applicable during detailed engineering as per technical specification/ design code/ functional requirement shall be supplied by bidder without any commercial implication to BHEL.
8	PE-TS-457-167-A101Part2 / Cl 5.2 of pg 6	DPT / MPI on all welds (100%).	Please note that DPT considered.	Either of DPT or MPI on all the welds is acceptable to BHEL.
9	PE-TS-457-167-A101Part2 / Cl 5.3 of pg 7	Radiography as per applicable joint efficiency	Please note that as per GAD'S joint efficiency is 0.7, radiography will not be considered. Please confirm.	The requirement of radiography shall be as per the applicable joint efficiency as per IS: 803. For tanks having joint efficiency of 0.7 (refer GA drawings of tanks, Section-I, Sub-Section-D, Annexure-III), no radiography to be considered inline with IS:803.
10	PE-TS-457-167-A101Part2 / Cl 7.0 of pg 7	List of commissioning spares Any other item required for successful commissioning of the tanks including rubber lining (to be specified clearly by bidder)	Please mention at this stage only.	List of commissioning spares indicated are minimum requirement. Bidder shall specify in their offer, the list of commissioning spares as required(if applicable) over and above the spares indicated in the technical specification.
11	PE-TS-457-167-A101Par8 / sl. No. 42 of pg 42	Painting spec for FGD tanks	Please note that we have considered Sl. No 41 kindly confirm	Bidder refer the Painting specification. Further outside of bottom surface of the tanks shall have 2 coats of high build coal tar epoxy suitably pigmented, DFT:80-100 microns each coat.

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Pre Bid Clarifications Reply				
S.No.	**Section/Clause/ Page No.**	**Statement of the referred clause**	**Clarification required**	**BHEL Reply**
12	PE-TS-457-167-A101Part1 / Cl 1.3 of pg 42	All vent valves are in bidder scope of supply,as per cl 9.0 (4) All valves are excluded from bidder's scope of work.	Both the statements are contradicting please clarify	Supply of all valves are excluded from bidder scope. Vent valves are not applicable as per GA drawing of tanks, bidder shall provide vent with suitable bird screen.
13	PE-TS-457-167-A101Part1 / as per cl 9.0 (4) of pg 42	All valves are excluded from bidder's scope of work.		
14	PE-TS-457-167-A101Part2 / Cl 7.0 of pg 7	As per commisiong spare 7.0 gasket material is CAF	Please Clarify, the gasket material	The gasket material shall be Butyl Rubber inline with the GA Drawings of the tanks(Section-I, Sub-Section-D, Annexure-III).
15	PE-TS-457-167-A101Part9 / drwng nos.Sketch-1, Sketch-2, Sketch-3, Sketch-4, Sketch-5, Sketch-6, Sketch-7, Sketch-8, Sketch-9	As per the drawings the gasket material is Butyl Rubber and bolts and nuts are IS1367		
16	PE-TS-457-167-A101Part9 / drwng nos.Sketch-1, Sketch-2, Sketch-3, Sketch-4, Sketch-5, Sketch-6, Sketch-7, Sketch-8, Sketch-9	As per the drawings the bolts and nuts are IS1367	Please Clarify, the bolts and nuts material	Refer reply to point no.6.
17	PE-TS-457-167-A101Part2 / Cl 7.0 of pg 7	as per cl. 3.17 bolts and nuts material is A 193 & 194		
18	PE-TS-457-167-A101Part9 / drwng nos.Sketch-1, Sketch-2, Sketch-3, Sketch-4, Sketch-5, Sketch-6, Sketch-7, Sketch-8, Sketch-9	Anchor bolts	Please confirm the number and size of anchor bolts	Please refer Civil details given under GA drawing for Anchor Bolts. All the requirements shown under GA drawing are bare minimum, further final sizes, additional quantity and any other additional items if found applicable during detailed engineering as per technical specification/ design code/ functional requirement shall be supplied by bidder without any commercial implication to BHEL.
19	PE-TS-457-167-A101Part10 /Annexure - 8 pg 46	TANK SCHEDULE	As per tank schedule rectangular tanks are not in our scope but rubber lining and agitator erection for the same are in our scope, kindly provide the drawings of tanks and agitator datasheet	The rectangular tanks mentioned by the bidder are actually RCC sumps. Further bidder's understanding regarding scope of rubber lining and agitator erection is correct. The typical drawings of the sump along with agitator mounting arrangement has been provided in SECTION-I, Sub Section-D, Annexure-III. The supply and erection of the rubber lining on the RCC sump, supply and erection mounting arrangement of the agitator including the erection of agitators in the sumps shall be in bidder's scope. Further the sumps are of RCC construction and is excluded from bidder's scope.
20	PE-TS-457-167-A101Part10 pg No. 48	Typical arrangement of vertical mounted agitator and agitator platform	Please confirm that this drawing is applicable for all the vertical agitator mounted all tanks.	Noted and confirm.
21	PE-TS-457-167-A101Part9 / drwng nos. Sketch-1, Sketch-2, Sketch-3, Sketch-4, Sketch-5, Sketch-6, Sketch-7, Sketch-8, Sketch-9	corrosion allowance for roof plate is not given.	We have not considered and corrosion allowance . Kindly confirm it.	Corrosion allowance shall be 1.5 mm refer clause 3.3 (a), SECTION –I, SUB SECTION –C1-A of technical specification.
22	PE-TS-457-167-A101Part9 / drwng nos. Sketch-1, Sketch-2, Sketch-3, Sketch-4, Sketch-5, Sketch-6, Sketch-7, Sketch-8, Sketch-9	Drpdown pipe for nozzels.	As there are agitators in the tanks,we feel dropdown pipe need not be considered . Please confirm regarding dropdown pipe for all the tanks.	The dropdown pipe for the inlet nozzle shall be considered by bidder in their offer. The applicability of the same shall be decided during detail engineering.
23	PE-TS-457-167-A101Part9 / drwng nos. Sketch-1, Sketch-2, Sketch-3, Sketch-4, Sketch-5, Sketch-6, Sketch-7, Sketch-8, Sketch-9	Anchor bolts,Anchor plate	Please confirm the number and size of anchor bolts.Thickness of anchor plate is not given . Kindly mention the thickness	Please refer BHEL's reply of S.no.18

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Pre Bid Clarifications Reply				
S.No.	**Section/Clause/ Page No.**	**Statement of the referred clause**	**Clarification required**	**BHEL Reply**
24	PE-TS-457-167-A101Part9 / drwng nos. Sketch-6	In the given drawing for Auxillary Absorbent tank , only one number of agitator is shown	Both this statement is contradicting. Please clarify regarding quantity of agitator need to be considered per tank for Auxillary Absorbent tank.	Please refer the revised GAD of Aux Absorbent Tank indicating horizontal/ side entry Agitator (annexure-III attached herewith). Please refer Annexure -IV for the revised Foundation Loading Drawing no Sketch-1 Sheet 2 of 2, Sketch-2 Sheet 2 of 2, Sketch-3 Sheet 2 of 2, Sketch-4 Sheet 2 of 2, Sketch-5 Sheet 2 of 2, Sketch-6, Sheet 2 of 2, Sketch-7 Sheet 2 of 2, Sketch-8 Sheet 2 of 2, Sketch-9 Sheet 2 of 2.
25	PE-TS-457-167-A101Part10 /Annexure - 8 pg 46	For Auxillary Absorbent tank ,Quantity of agitator rquired is 3 no. per tank		

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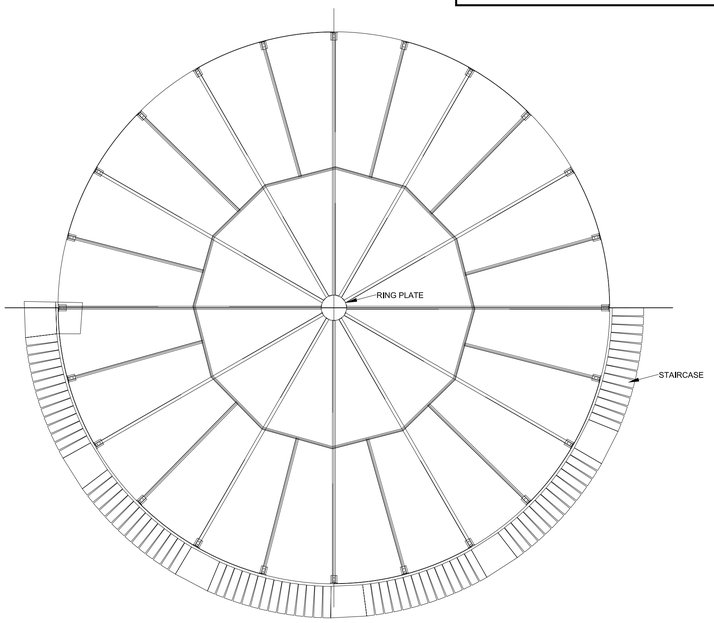
AGITATOR LOADS (ANNEXURE-I)

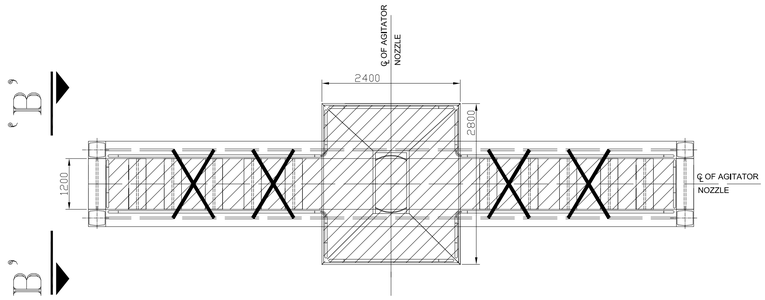
Sl.no.	Description	Primary Hydrocyclone feed tank	Filtrate water tank	Secondary Hydrocyclone feed tank	Waste water Tank	Limestone Slurry Storage tank	Auxiliary Absorbent Tank	Absorber Area Drain Pit	Gypsum Dewatering Area Drain Pits	Ball Mill Area Drain Pit
1	**Tank Sl No.**	1	2	3	4	5	6	10	11	12
2	**Type of agitator**	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Marine Propeller – Horizontal Type (Side Entry),	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)
	Dimension (in m)									
a)	Diameter	7.0	5.5	6.0	7.0	13.5	12.5	-	-	-
b)	Height	7.5	6.2	6.2	8.0	15.4	13.8	4 m(h) X 4m(w) X 4m (ht)	4 m(h) X 4m(w) X 4m (ht)	4 m(h) X 4m(w) X 4m (ht)
3	**Quantity of Agitator per tank**	1	1	1	1	1	3	1	1	1
4	**Total no. of tanks**	1	1	1	1	2	1	3	1	1
5	Loads									
a)	Static Load (assembly wt./agitator assembly) (in Tonnes)	**2.3**	**0.98**	**0.98**	**2.3**	**5.8**	**1.35**	**0.5**	**0.5**	**0.5**
b)	Dynamic load (per agitator assembly) (in Tonnes)	**4.6**	**2.0**	**2.0**	**4.6**	**11.6**	**2.7**	**1.1**	**1.1**	**1.1**
Notes										
1	**The loads furnished above is tentative and for tender purpose only. The final loads shall be furnished during detail engineering.**									
2	**The above details shall be read in conjunction with the GA drawing of tanks, tank schedule etc. furnished along with the technical specification.**									

DRAWING NO. 3-FW-000-00-505

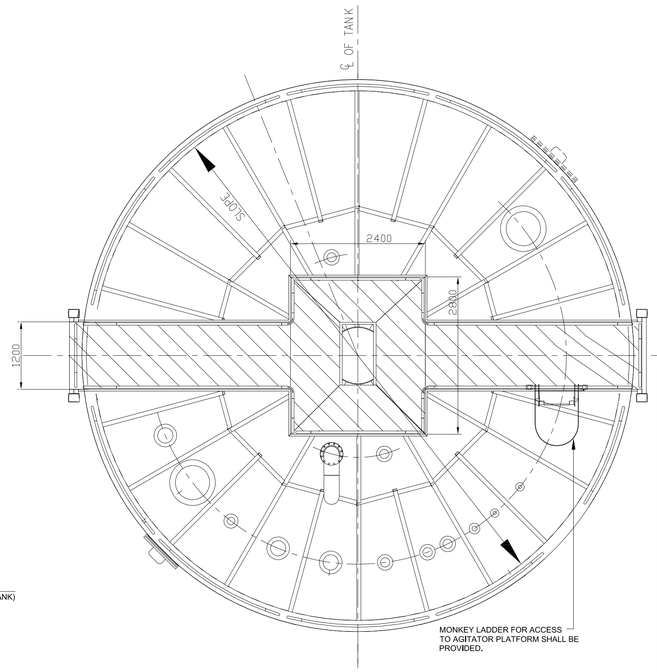
ANNEXURE-II



PLAN



DETAILS OF PLATFORM FOR AGITATORS



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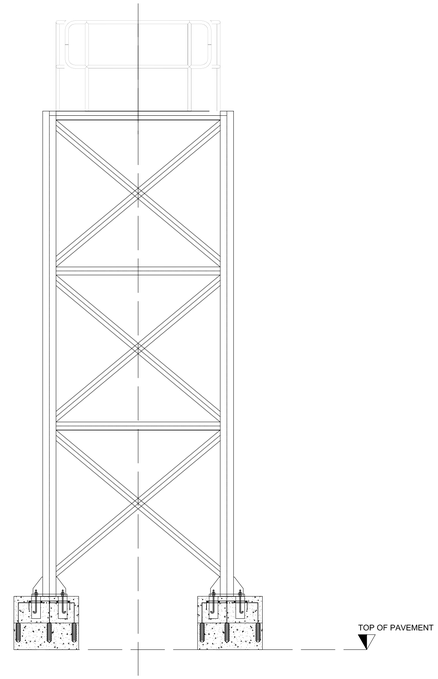

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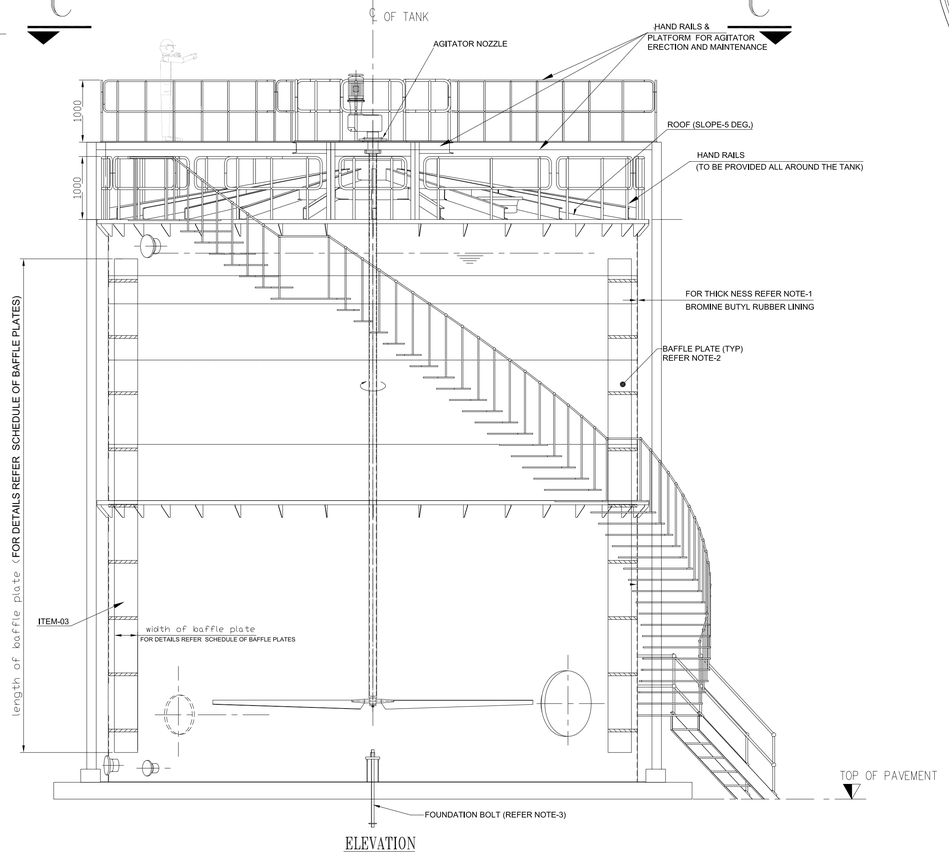
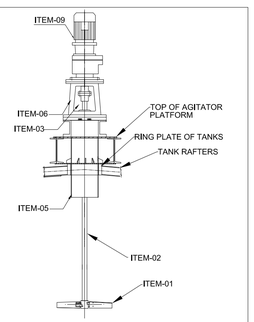


ELEVATION

SCHEDULE OF BAFFLE PLATES

TANK NAME	TANK DIA.(in M)	TANK HT.(in M)	BAFFLE PLATE DETAILS (All Dimensions in MM) (*)				REMARKS
			NOS./TANK	APPROX. LENGTH	APPROX. WIDTH	APPROX. THK.	
AUXILIARY ABSORBER TANK	12.5	13.8	-	-	-	-	BAFFLE PLATES NOT APPLICABLE
FILTERATE WATER TANK	5.5	6.2	04	7700	650	12	
PROCESS WATER TANK	6.0	6.7	-	-	-	-	AGITATOR NOT APPLICABLE
WASTE WATER TANK	7.0	8.0	04	11800	1000	18	
PRIMARY HYDROCYCLONE TANK	7.0	7.5	04	9700	800	16	
SECONDARY HYDROCYCLONE TANK	6.0	6.2	04	8950	750	14	
LIMESTONE SLURRY STORAGE TANK	13.5	15.4	04	6350	1450	40	
BELT WASH TANK	3.5	4.2	-	-	-	-	AGITATOR NOT APPLICABLE
CAKE WASH TANK	3.5	4.2	-	-	-	-	AGITATOR NOT APPLICABLE
GYPSUM DEWATERING AREA DRAIN PIT	4 (L) X 4 (W) X 4 (H)		-	-	-	-	BAFFLE PLATES NOT APPLICABLE
ABSORBER AREA DRAIN PIT	4 (L) X 4 (W) X 4 (H)		-	-	-	-	BAFFLE PLATES NOT APPLICABLE
BALL MILL AREA DRAIN PIT	4 (L) X 4 (W) X 4 (H)		-	-	-	-	BAFFLE PLATES NOT APPLICABLE

(*) THERE MAY BE A (+/-)10% VARIATION IN THE DIMENSIONS . EXACT DIMENSIONS SHALL BE DECIDED DURING DETAIL ENGINEERING.



REMARKS	
1	This is typical drawing for vertical agitator mounting in circular tanks.
2	For tank dia (D) and Height (H) , bidder shall be refer to the technical specification.

S.NO	ITEM	SUPPLY	E&C	REMARKS
1	Impeller Blades	BHEL	BIDDER	SUPERVISION OF ERECTION BY AGITATOR SUPPLIER (SHALL BE ARRANGED BY BHEL). COMMISSIONING BY AGITATOR SUPPLIER
2	Shafts	BHEL	BIDDER	
3	Coupling arrangement (Flexible)	BHEL	BIDDER	SUPERVISION OF ERECTION BY AGITATOR SUPPLIER (SHALL BE ARRANGED BY BHEL). COMMISSIONING BY AGITATOR SUPPLIER
4	Gland Packing, Seals, O Rings, Glands	BHEL	BIDDER	
5	Shaft Sleeve	BIDDER	BIDDER	
6	Lantern Stools (Bearing Housing), Safety Guard	BHEL	BIDDER	SUPERVISION OF ERECTION BY AGITATOR SUPPLIER (SHALL BE ARRANGED BY BHEL). COMMISSIONING BY AGITATOR SUPPLIER
7	Bearings	BHEL	BIDDER	
8	AGITATOR Mounting Flanges with gaskets and fasteners	BIDDER	BIDDER	
9	Drive Motor(IE3) with gearbox arrangement	BHEL	BIDDER	SUPERVISION OF ERECTION BY AGITATOR SUPPLIER (SHALL BE ARRANGED BY BHEL). COMMISSIONING BY AGITATOR SUPPLIER
10	Mating Flange for Supporting on Slurry Tank Roof	BIDDER	BIDDER	
11	Baffle plate (min 4 nos. per tank)			

NOTES:

1. FOR THICKNESS AND SPECIFICATION OF RUBBER LINING (BIDDERS SCOPE) REFER TANKS SCHEDULE AND GA OF MISCELLANEOUS FGD TANKS PROVIDED WITH THE TECHNICAL SPECIFICATION.
2. FOUNDATION BOLTS FOR ALL TANKS SHALL BE IN BIDDER'S SCOPE. THE MINIMUM NO. OF FOUNDATION BOLTS HAVE BEEN SPECIFIED IN THE GA OF MISCELLANEOUS FGD TANKS. THE FINAL QUANTITY SHALL BE DECIDED DURING DETAIL ENGINEERING.
3. FOR ROOF SLOPE OF TANKS REFER GA OF MISCELLANEOUS FGD TANKS.
4. ALL DIMENSIONS, UNLESS OTHERWISE MENTIONED, SHALL BE IN MM.
5. FOR GA OF MISCELLANEOUS FGD TANKS , REFER SECTION-I, SUB-SECTION-D, ANNEXURE-III OF TECHNICAL SPECIFICATION.
6. 8MM THICK CHEQUERED PLATES SHALL BE CONSIDERED ON ALL AGITATOR PLATFORMS.
7. THE LOCATION AND ORIENTATION OF PLATFORM/STAIRCASE ARE REPRESENTATIVE ONLY. FINAL LOCATION AND ORIENTATION SHALL BE DECIDED DURING DETAIL ENGINEERING BASED ON THE ACTUAL LAYOUT.
8. THE NOZZLES SHOWN IN THE DRAWING IS INDICATIVE ONLY. FOR NOZZLE DETAILS REFER GA OF MISCELLANEOUS FGD TANKS.
9. FOR SIDE MOUNTED AGITATORS MOUNTING ON AUXILARY ABSORBER TANK, REFER SKETCH-2

NTPC DRG. No.

PROJECT: 3X660MW NABINAGAR STPP (SYSTEM : FLUE GAS DESULPHURIZATION)

CUSTOMER: NTPC LIMITED. (A GOVERNMENT OF INDIA ENTERPRISE)

BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

TITLE: TYPICAL ARRANGEMENT OF VERTICAL MOUNTED AGITATOR & AGITATOR PLATFORM, BAFFLE PLATES

SCALE : NTS

DRAWING NO. SKETCH-11

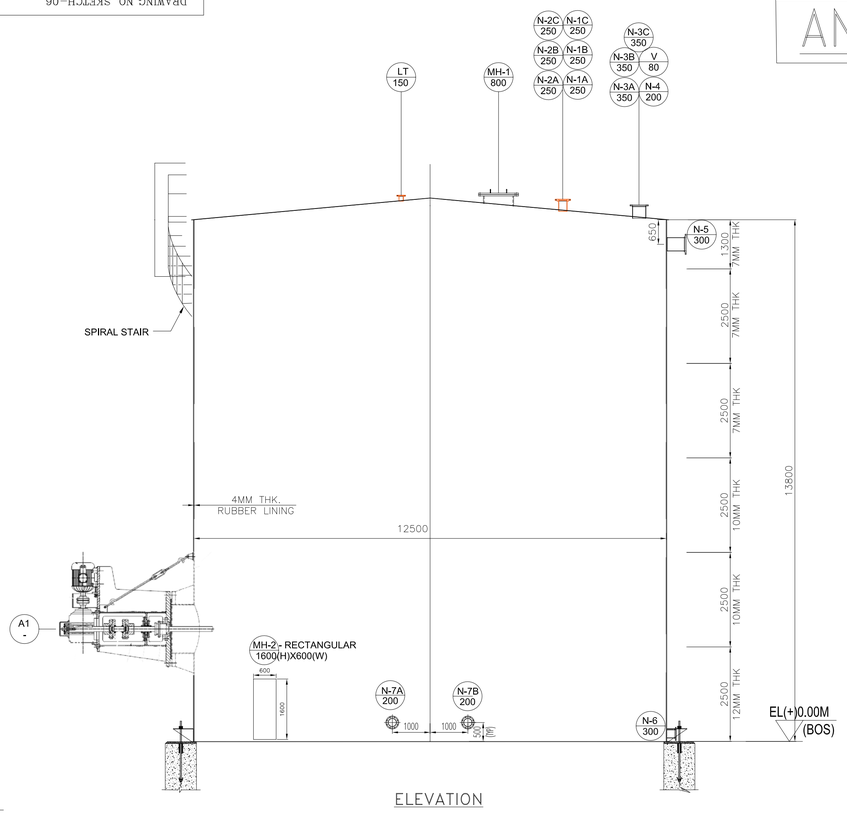
SH 01 OF 02

REV. 00

Size A1

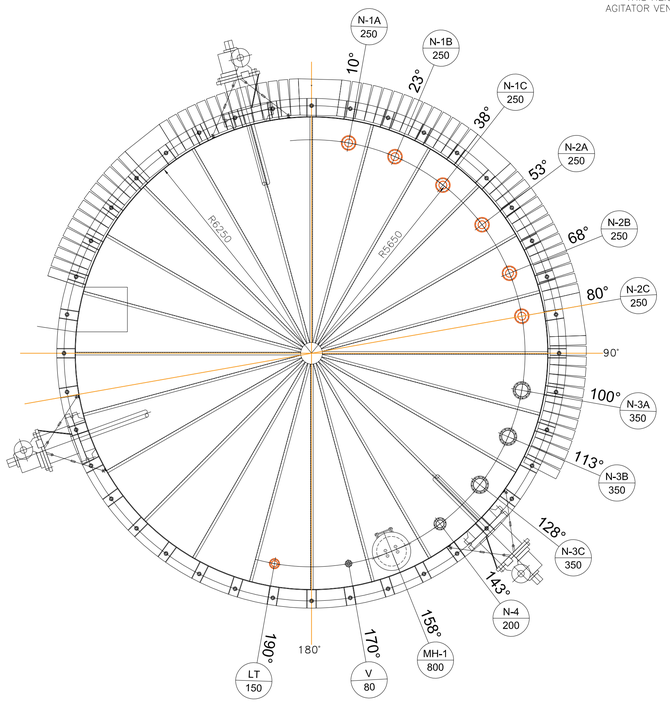
DRAWING NO. SKETCH-06

ANNEXURE-III



ELEVATION

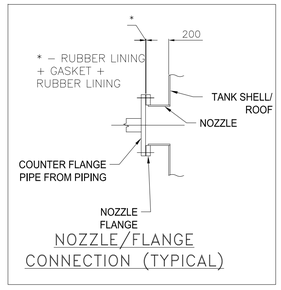
* – THIS HEIGHT WILL BE DECIDED BASED ON AGITATOR VENDOR RECOMMENDATION



PLAN

DESIGN DATA		
DESIGN CODE	–	IS:803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	–	GYPSUM BLEED/SLURRY
TANK CAPACITY (HOLD VOLUMNE)	M^3	1595
TANK CAPACITY (EFFECTIVE)	M^3	1570
TYPE OF TANK	–	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	–	5°
DESIGN PRESSURE	–	HYDROSTATIC HEAD
OPERATING PRESSURE	–	ATMOSPHERIC
OPERATING TEMPERATURE	°C	63
HYDOR TESTING	–	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFECIENCY	–	0.7
RADIOGRAPHY	–	NO APPLICABLE
CORROSION ALLOWANCE	MM	1.5MM FOR SHELL AND BOTTOM PLATE
WIND CODE	–	AS PER CONTRACT SPECIFICATION
SEISMIC CODE	–	AS PER CONTRACT SPECIFICATION
NO. OF TANK	NO.	01
DIAMETER (I.D)	MM	12500
HEIGHT	MM	13800
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	12,10,8,7 (REFER ELEVATION)
BOTTOM PLATE THICKNESS	MM	8
INSULATION	–	NOT APPLICABLE
INSIDE LINING	–	4MM THICK OF BEST QUALITY BROMINE BUTYL RUBBER LINING WITH HARDNESS 55±5 (SHORE A HARDNESS)

MATERIAL SPECIFICATION	
ITEM	MATERIAL
SHELL, ROOF, BASE AND BAFFLE PLATE	IS:2062 E250 GRADE BR
STRUCTURES	IS:2062 E250 GRADE A/BR
STAIRWAYS & PLTFS	IS:2062 E250 GRADE A/BR
MANHOLE	IS:2062 E250 GRADE BR
NOZZLE	A106 Gr B
NOZZLE FLANGES	IS:2062 E250 GRADE BR
NOZZLE REINFORCEMNT	IS:2062 E250 GRADE BR
NOZZLE NECKS	IS:1239
HAND RAILING	IS:1161
GASKETS	BUTYL RUBBER
BOLT	IS: 1367 CLASS 4.4
FITTINGS	A-105
EARTHING LUG	IS:2062 E250 GRADE BR
ANCHOR BOLT	IS:2062 E250 GRADE BR



NOZZLE/FLANGE CONNECTION (TYPICAL)

NOZZLE SCHEDULE								
NOZZLE			QTY	FLANGE			SERVICE	REMARKS
MARK	SIZE	Sch. No.		RATING	FACING	STANDARD		
A-1	–	–	3	–	–	–	AGITATOR	
MH-1	NB800	–	1	–	SOFF	PLATE	MANHOLE	WITH HINGE
MH-2	1600(H)X 600(W)	–	1	PLATE	SOFF	–	MANHOLE	FOR ENTRY WITH WHEELBARROW
N-1A/B/C	NB250	–	3	150	SOFF	ANSI B16.5	LIQUID INLET	
N-2A/B/C	NB250	–	3	150	SOFF	ANSI B16.5	LIQUID INLET	
N-3A/B/C	NB350	–	3	150	SOFF	ANSI B16.5	LIQUID INLET	
LT	NB150	–	1	150	SOFF	ANSI B16.5	LEVEL TRANSMITTER	
V	NB80	–	1	150	SOFF	ANSI B16.5	VENT	
N-4	NB200	–	1	150	SOFF	ANSI B16.5	MINIMUM FLOW	
N-5	NB300	–	1	150	SOFF	ANSI B16.5	OVER FLOW	
N-6	NB300	–	1	150	SOFF	ANSI B16.5	BOTTOM DRAIN	
N-7A/B	NB200	–	2	150	SOFF	ANSI B16.5	PUMP SUCTION	

NOTES:

1. ALL DIMENSIONS ARE IN MM, UNLESS SPECIFIED OTHERWISE.
2. OUTSIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
3. NOZZLE REINFORCEMENTS SHALL BE AS PER IS:803.
4. NOZZLE PROJECTIONS ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
5. ALL REINFORCEMENT PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
6. NOZZLE AND FLANGE DETAILS SHALL BE AS PER IS803.
7. ALL BOLT HOLES SHALL STRADDLE VERTICAL CENTERLINES ON SHELL AND RADIAL CENTERLINES ON ROOF.
8. ALL PROTRUSIONS, SHARP EDGES AND SPATTER, ETC. SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
9. HYDRO TEST SHALL BE AS PER IS803. LINING SHALL BE CARRIED-OUT AFTER HYDRO TEST.
10. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
11. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION.
12. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER MEMBER JOINT UNLESS SPECIFIED OTHERWISE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT SITE REQUIREMENT.
14. NO OF AGITATOR SHALL BE IN LINE WITH THE AGITATOR SCHEDULE.

** AGITATOR SHOWN ARE INDICATIVE WILL BE FINALIZED DURING DETAIL ENGINEERING.
*** NOZZLE LOCATION SHOWN IN DRAWING ARE INDICATIVE WILL BE FINALIZED DURING DETAIL ENGINEERING.

REV.	DATE	ALT'D.	CK'D.	APP'D.
–	–	–	–	–

PROJECT: 3X660MW NABINAGAR STPP (SYSTEM : FLUE GAS DESULPHURIZATION)

CUSTOMER: NTPC LIMITED. (A GOVERNMENT OF INDIA ENTERPRISE)

BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET-632 406.

DEPT CODE: M

	NAME	SIGN	DATE
DRN			
CHD			
APPD			

TITLE: GENERAL ARRANGEMENT AND DATA SHEET OF AUXILIARY ABSORBENT (STORAGE) TANK

SCALE : NTS

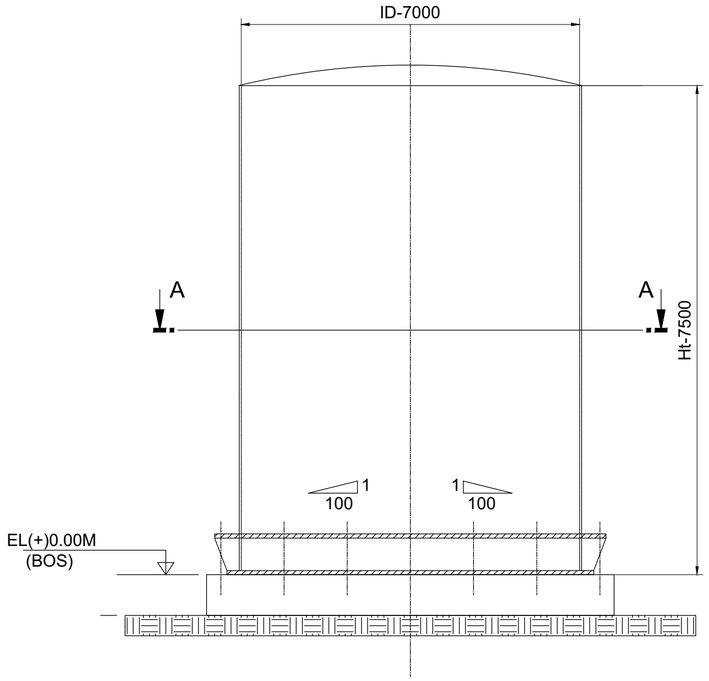
DRAWING NO. SKETCH-06 | SH 01 OF 02 | REV.00

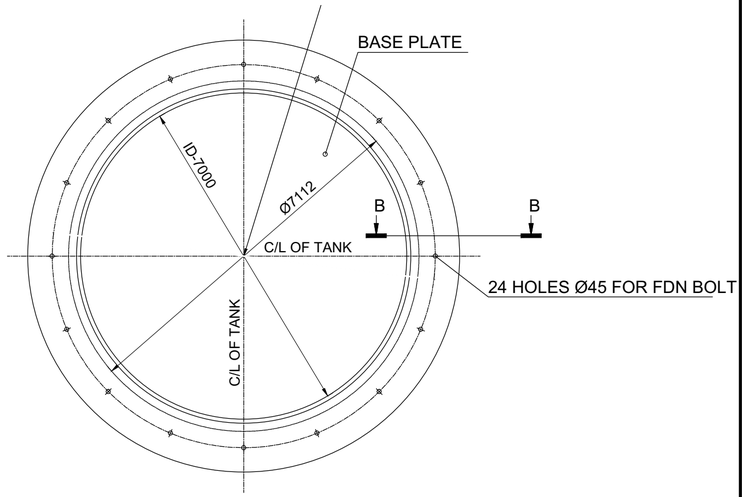
Size A1

ANNEXURE-IV

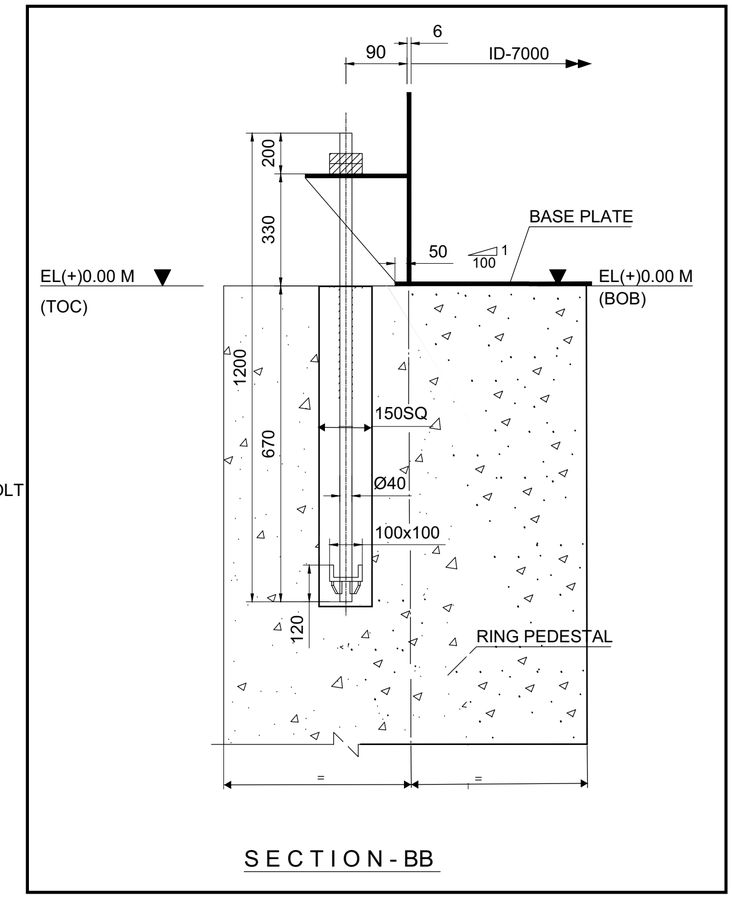
DRAWING NO. 2-FW-000-00399

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION-BB

LOAD DATA :

Empty Weight, We (T)	21
Operating Weight, Wo (T)	382
Max Horizontal Force, H (T)	
Due to Wind	9
Due to Seismic	78
Max Moment, M (T-m)	
Due to Wind	33
Due to Seismic (Ringwall Moment)	226

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03. -VOID

04. -VOID

05. -VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	C - CRITICAL DIMENSION

NUMBER OF TANK (s) = 01

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

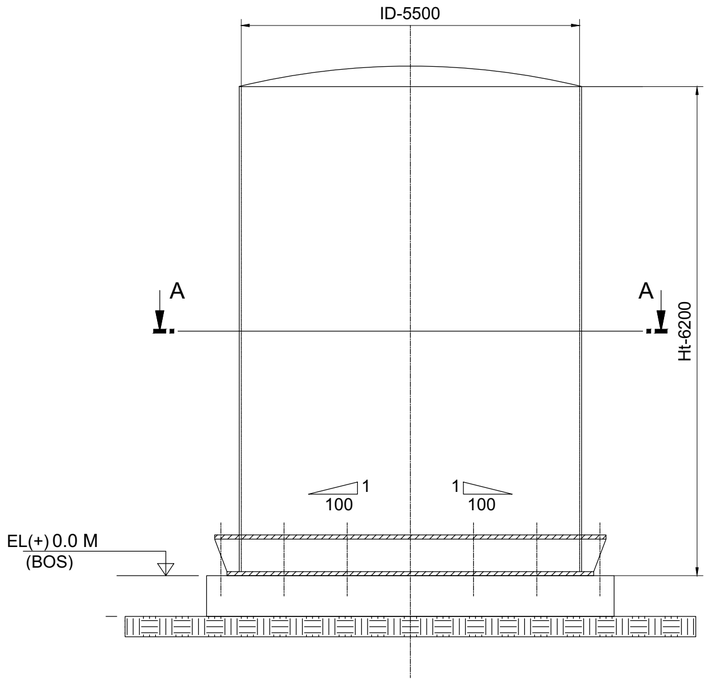
TITLE: FOUNDATION LOADING OF PRIMARY HYDROCYCLONE FEED TANK

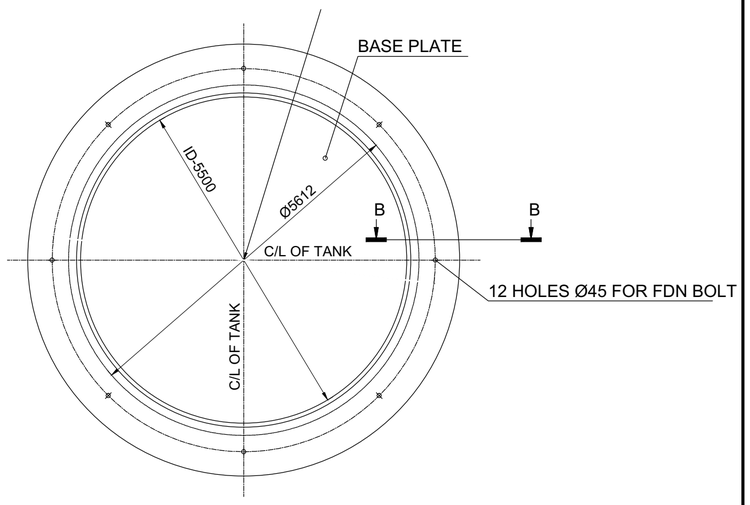
DRAWING NO. SKETCH-01 | SCALE : NTS | SHEET 2 OF 2 | REV 00

SIZE A2

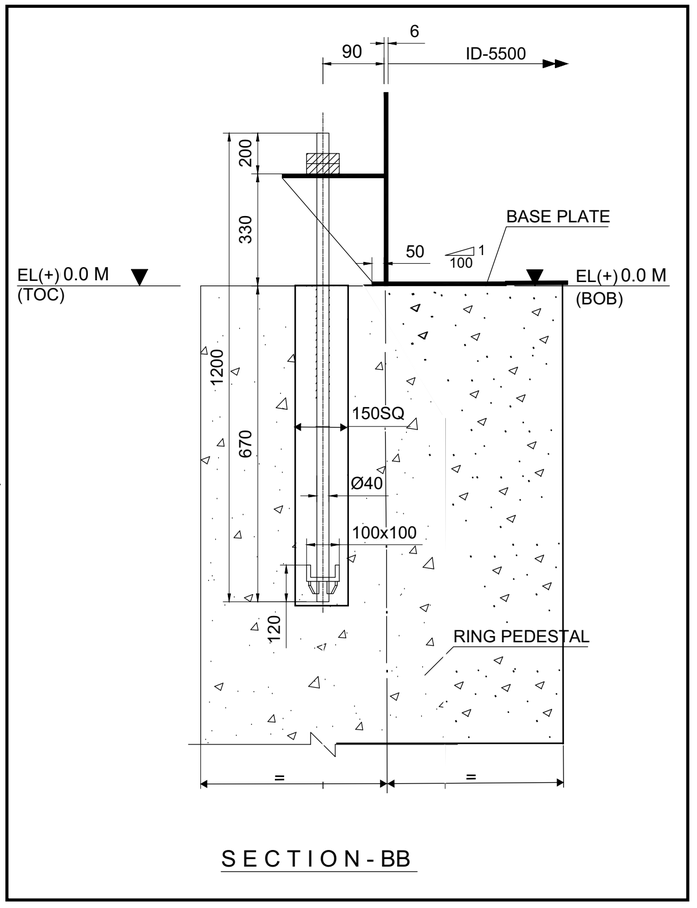
DRAWING NO. 2-FW-000-00394

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION - BB

LOAD DATA :

Empty Weight, We (T)	16
Operating Weight, Wo (T)	185
Max Horizontal Force, H (T)	
Due to Wind	6
Due to Seismic	37
Max Moment, M (T-m)	
Due to Wind	18
Due to Seismic (Ringwall Moment)	89

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03. -VOID

04. -VOID

05. -VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	[C] - CRITICAL DIMENSION

NUMBER OF TANK (s) = 01

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

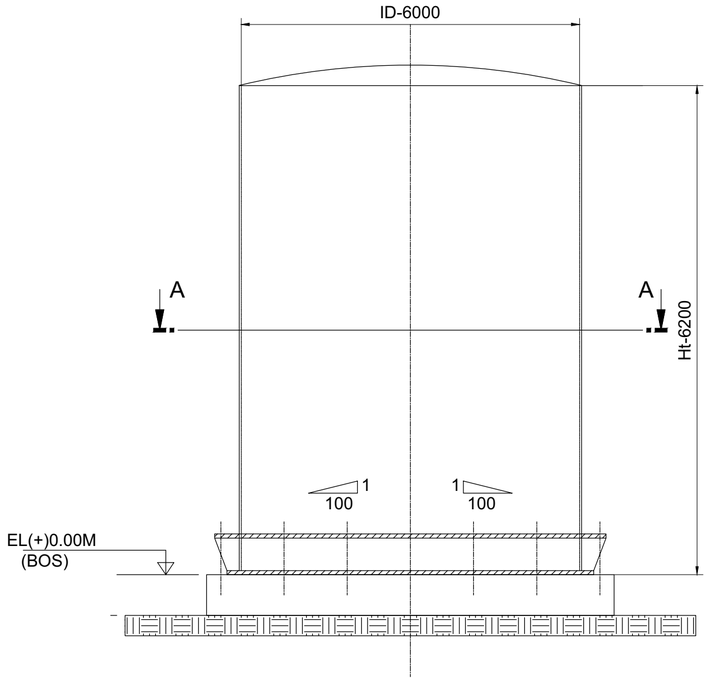
TITLE: FOUNDATION LOADING OF FILTER WATER TANK

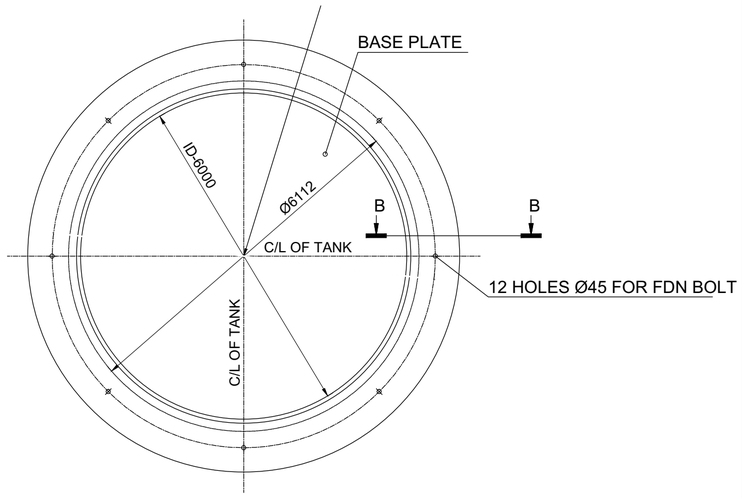
DRAWING NO.	SCALE : NTS		
SKETCH-02		SHEET 2 OF 2	REV 00

SIZE A2

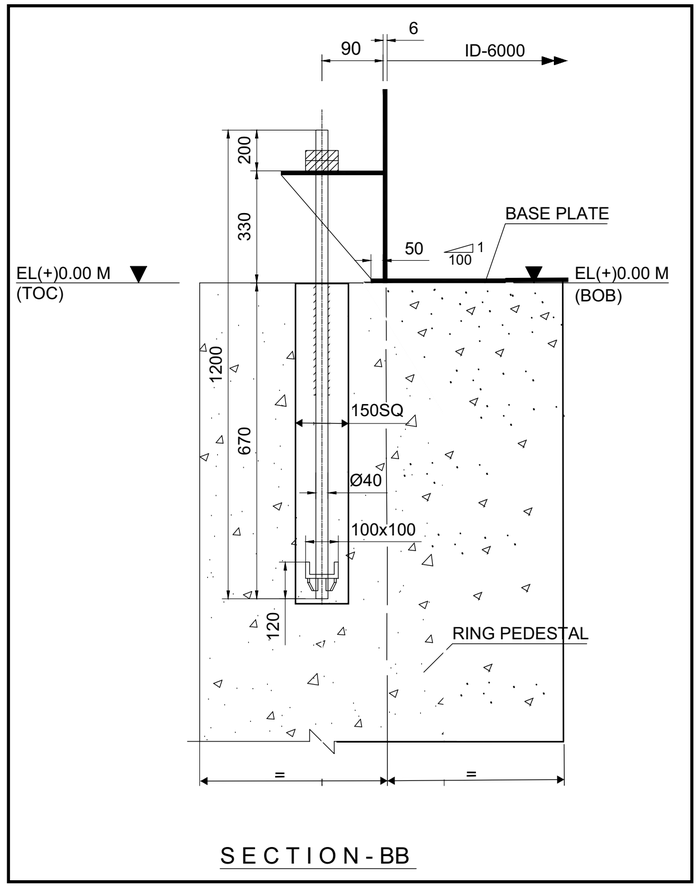
DRAWING NO. 2-FW-000-00396

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION-BB

LOAD DATA :

Empty Weight, We (T)	17
Operating Weight, Wo (T)	219
Max Horizontal Force, H (T)	
Due to Wind	7
Due to Seismic	43
Max Moment, M (T-m)	
Due to Wind	20
Due to Seismic (Ringwall Moment)	105

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03. -VOID

04. -VOID

05. -VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	[C] - CRITICAL DIMENSION

NUMBER OF TANK (s) = 01

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

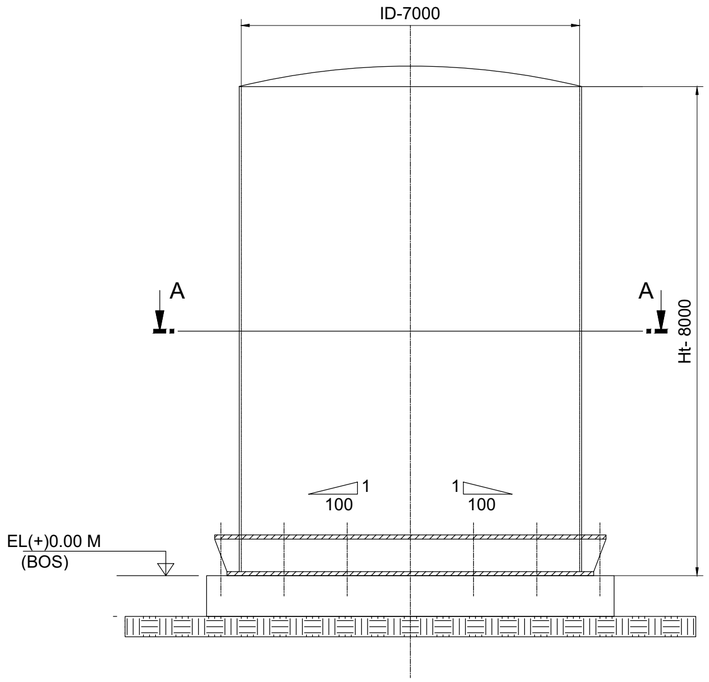
TITLE: FOUNDATION LOADING OF SECONDARY HYDROCYCLONE FEED TANK

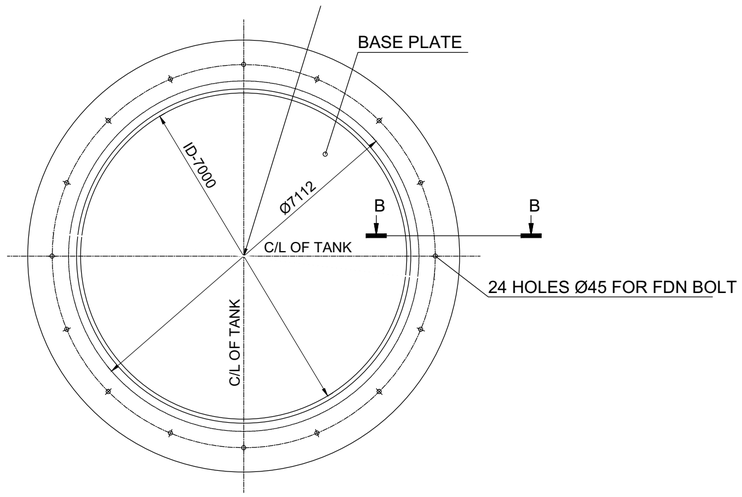
DRAWING NO.	SCALE : NTS		
SKETCH-03		SHEET 2 OF 2	REV 00

SIZE A2

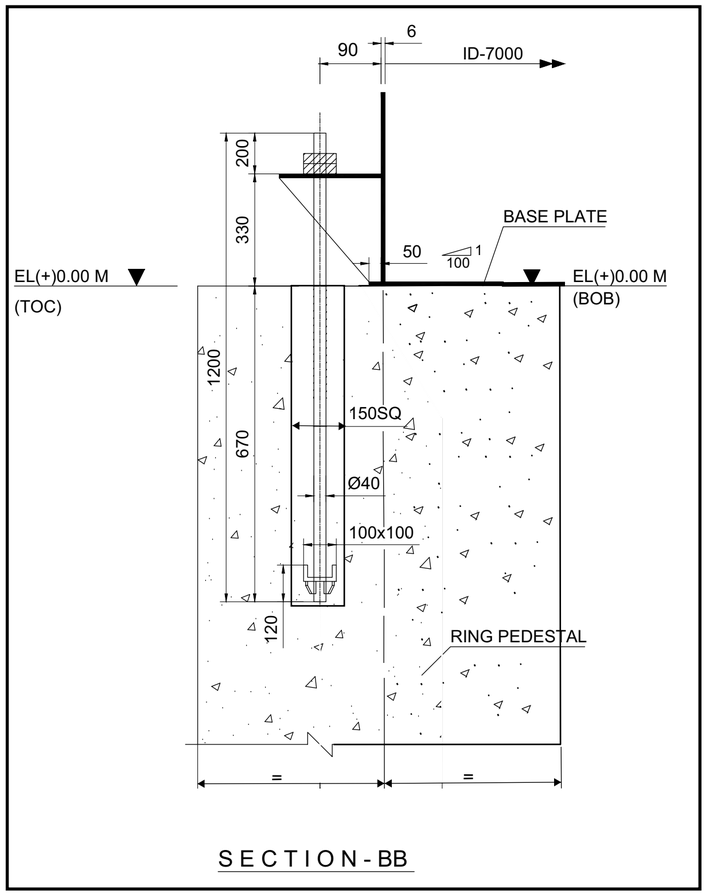
DRAWING NO. 2-FW-000-00395

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION-BB

LOAD DATA :

Empty Weight, We (T)	22
Operating Weight, Wo (T)	376
Max Horizontal Force, H (T)	
Due to Wind	10
Due to Seismic	79
Max Moment, M (T-m)	
Due to Wind	38
Due to Seismic (Ringwall Moment)	250

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03. -VOID

04. -VOID

05. -VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	[C] - CRITICAL DIMENSION

NUMBER OF TANK (s) = 01

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

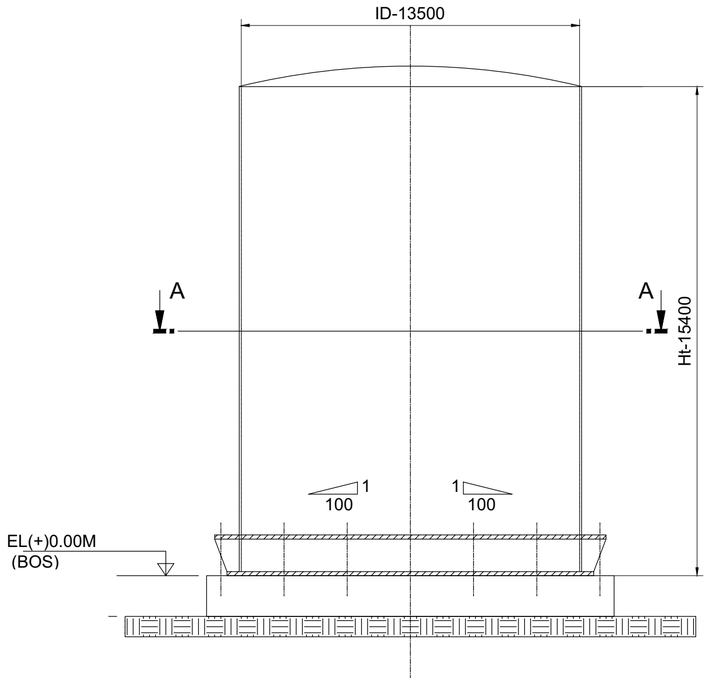
TITLE: FOUNDATION LOADING OF WASTE WATER TANK

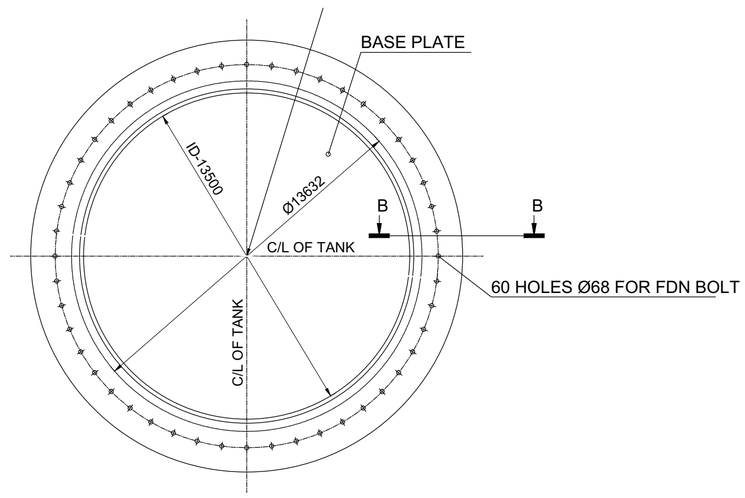
DRAWING NO. SKETCH-04 | SCALE : NTS | SHEET 2 OF 2 | REV 00

SIZE A2

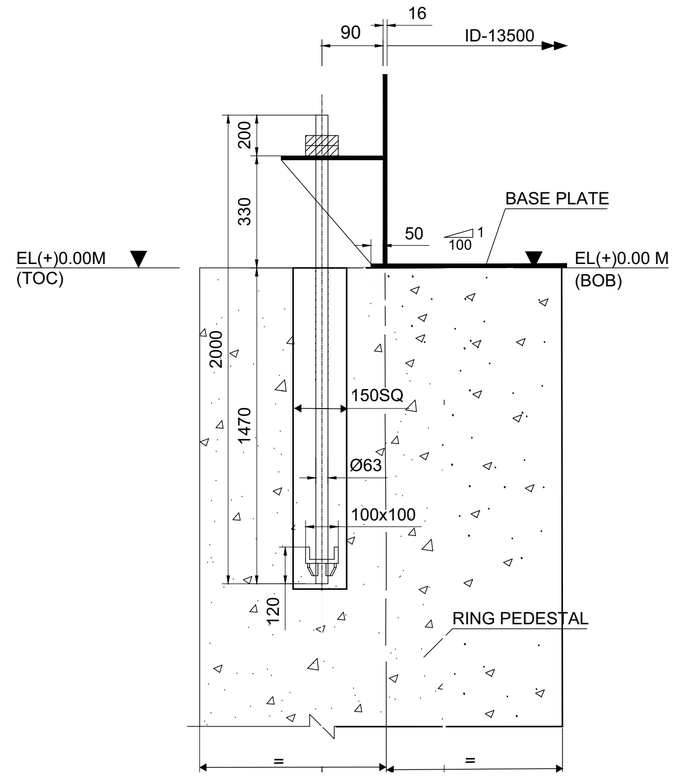
DRAWING NO. 2-FW-000-00392

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION-BB

LOAD DATA :

Empty Weight, We (T)	89
Operating Weight, Wo (T)	2845
Max Horizontal Force, H (T)	
Due to Wind	39
Due to Seismic	622
Max Moment, M (T-m)	
Due to Wind	294
Due to Seismic (Ringwall Moment)	3865

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03. -VOID

04. -VOID

05. -VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

NUMBER OF TANK (s) = 02

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	[C] - CRITICAL DIMENSION

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

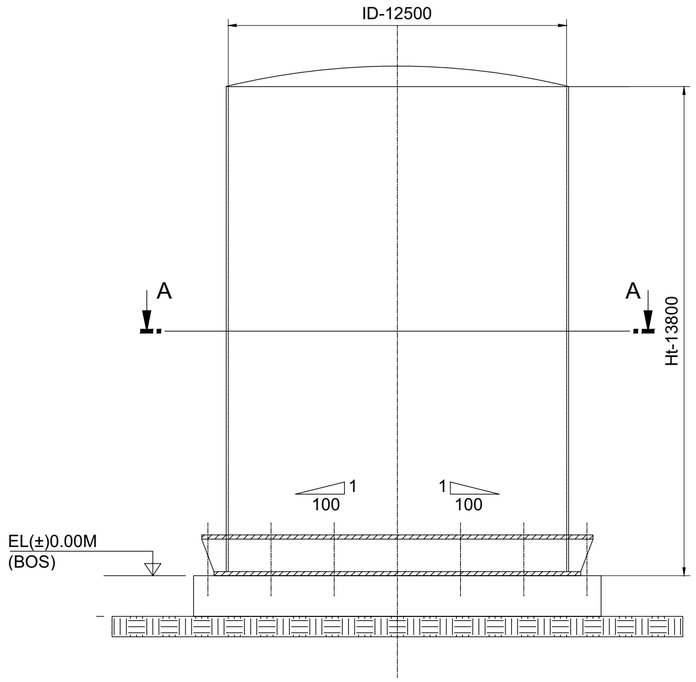
TITLE: FOUNDATION LOADING OF LIMESTONE SLURRY STORGE TANK

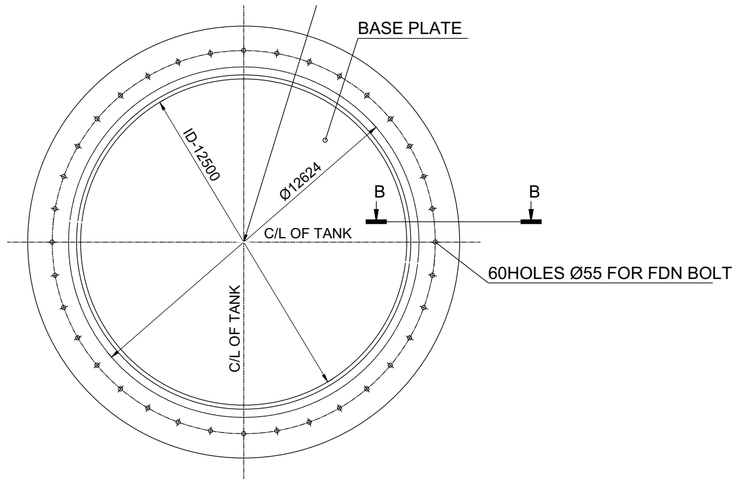
DRAWING NO.	SCALE : NTS		
SKETCH-05		SHEET 2 OF 2	REV 00

SIZE A2

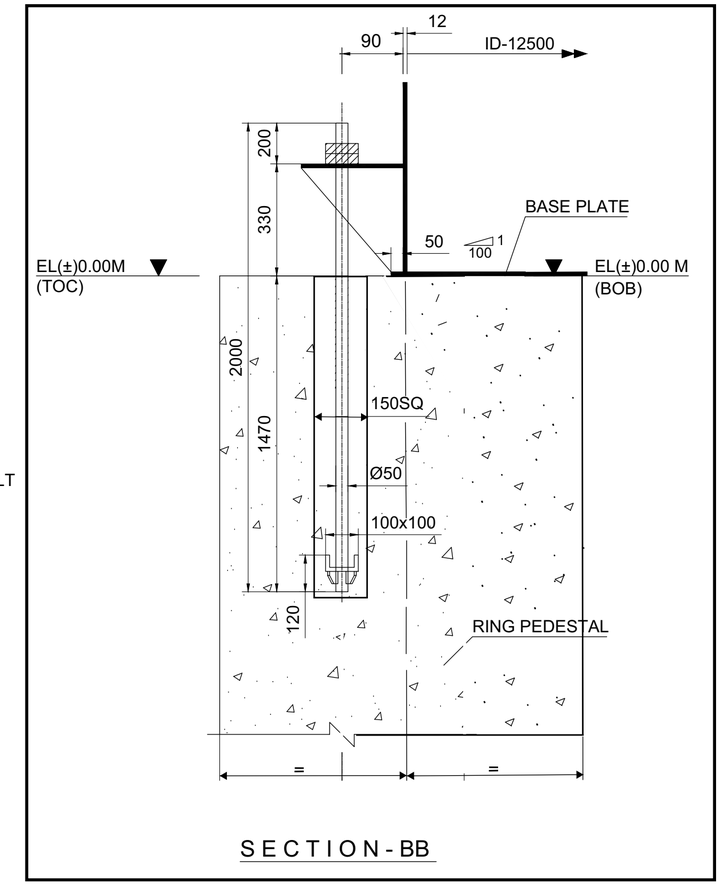
DRAWING NO: 2-FW-000-00393

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION-BB

LOAD DATA :

Empty Weight, We (T)	69
Operating Weight, Wo (T)	2185
Max Horizontal Force, H (T)	
Due to Wind	31
Due to Seismic	470
Max Moment, M (T-m)	
Due to Wind	213
Due to Seismic (Ringwall Moment)	2597

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03. -VOID

04. -VOID

05. -VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

NUMBER OF TANK (s) = 01

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	C - CRITICAL DIMENSION

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

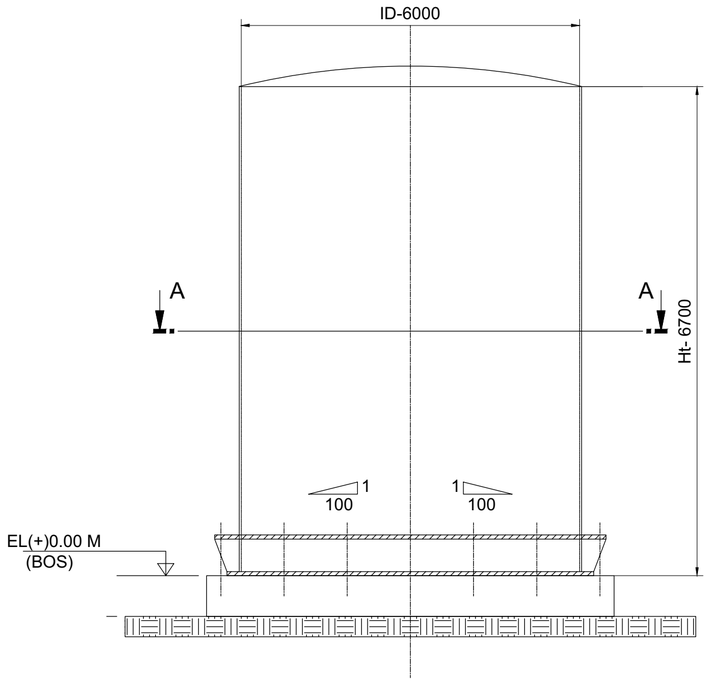
TITLE: FOUNDATION LOADING OF AUXILIARY ABSORBENT TANK

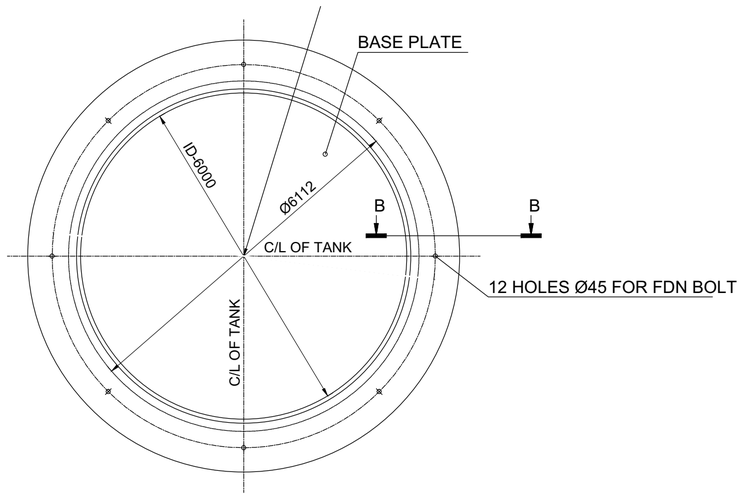
DRAWING NO. SKETCH-06 | SCALE : NTS | SHEET 2 OF 2 | REV 00

SIZE A2

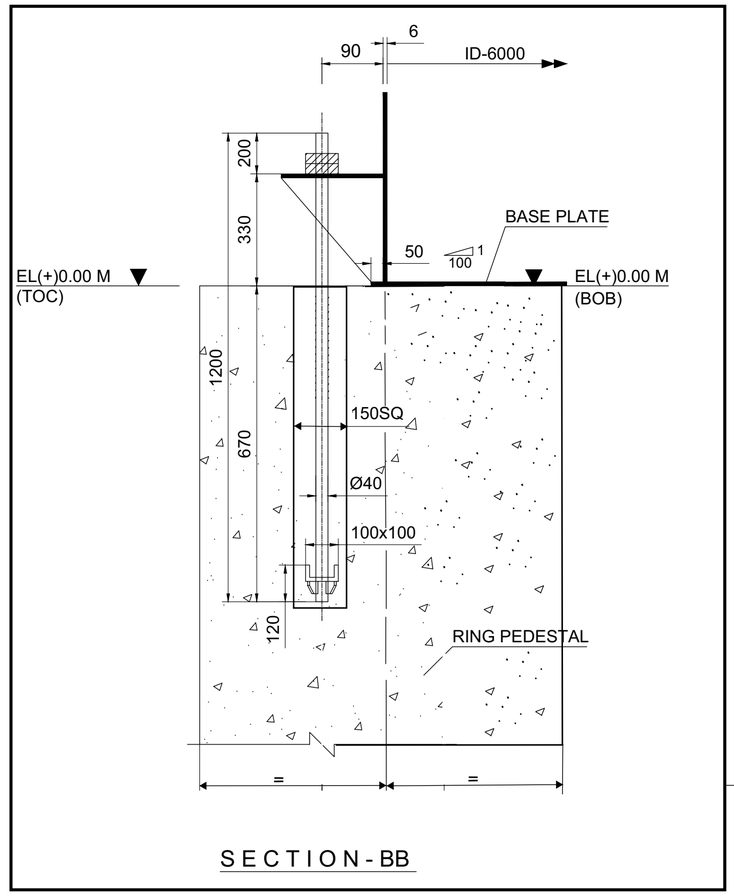
DRAWING NO. 2-FW-000-00397

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION-BB

LOAD DATA :

Empty Weight, We (T)	17
Operating Weight, Wo (T)	207
Max Horizontal Force, H (T)	
Due to Wind	7
Due to Seismic	42
Max Moment, M (T-m)	
Due to Wind	23
Due to Seismic (Ringwall Moment)	128

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03.-VOID

04.-VOID

05.-VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	C - CRITICAL DIMENSION

NUMBER OF TANK (s) = 02

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

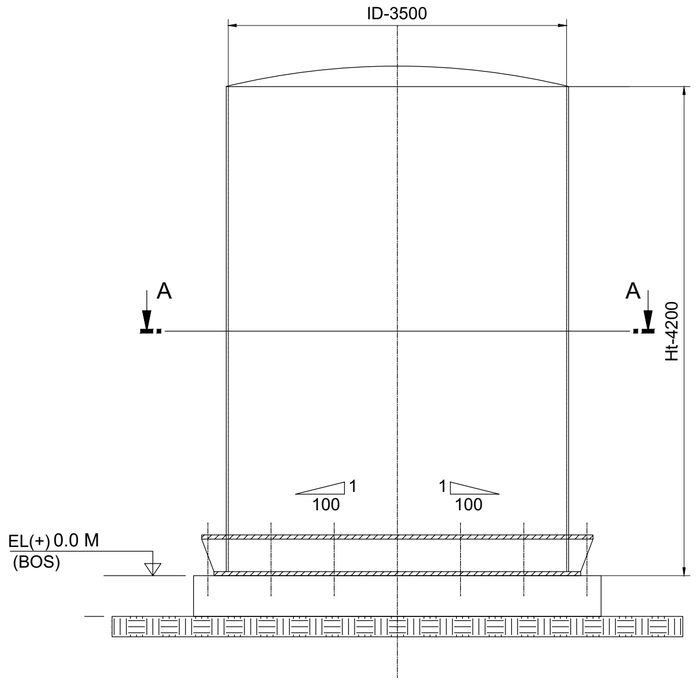
TITLE: FOUNDATION LOADING OF PROCEES WATER TANK

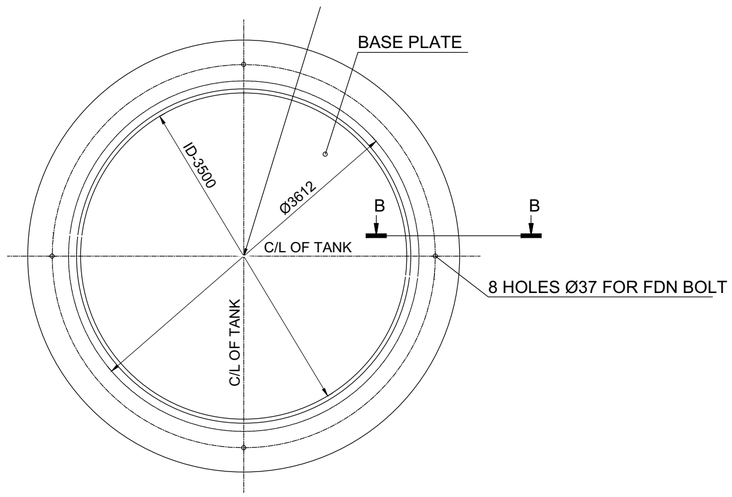
DRAWING NO.	SCALE : NTS		
SKETCH-07		SHEET 2 OF 2	REV 00

SIZE A2

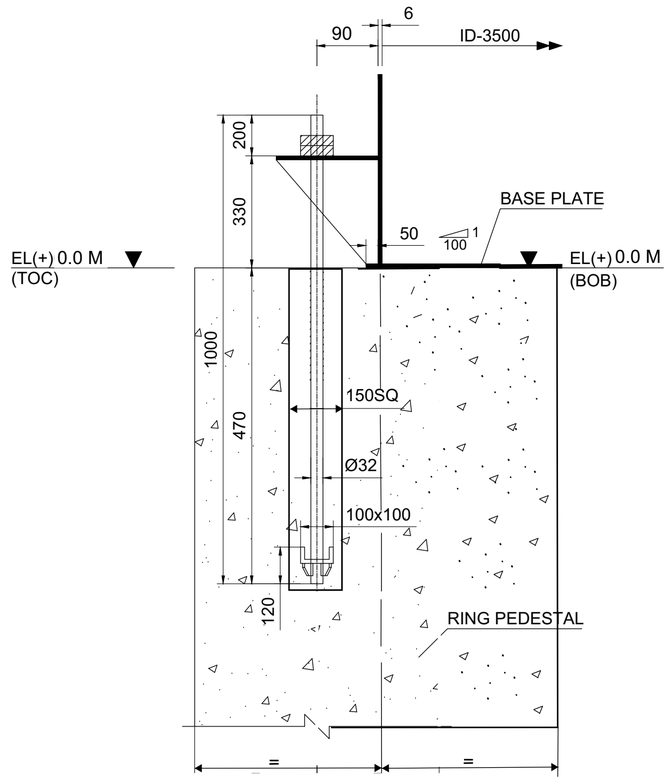
DRAWING NO. 2-FW-000-00398

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION-BB

LOAD DATA :

Empty Weight, We (T)	10
Operating Weight, Wo (T)	50
Max Horizontal Force, H (T)	
Due to Wind	3
Due to Seismic	10
Max Moment, M (T-m)	
Due to Wind	6
Due to Seismic (Ringwall Moment)	15

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03. -VOID

04. -VOID

05. -VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

NUMBER OF TANK (s) = 02

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	[C] - CRITICAL DIMENSION

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

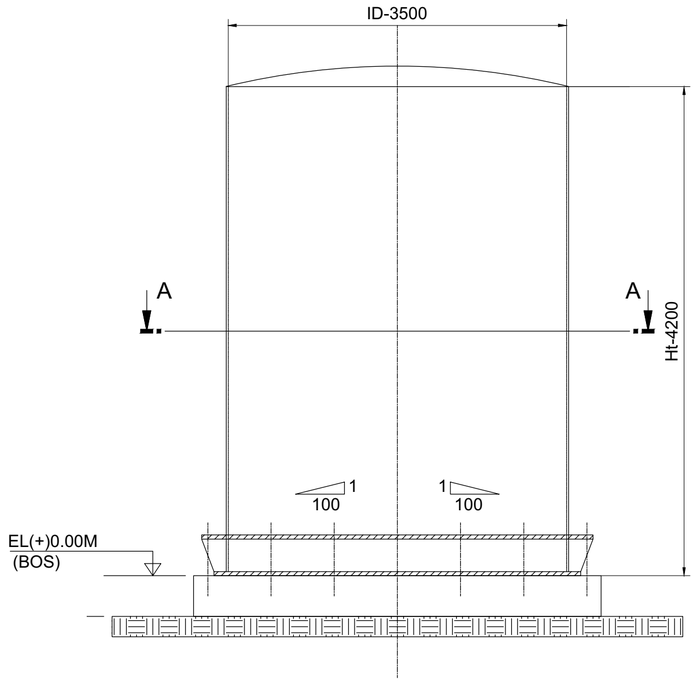
TITLE: FOUNDATION LOADING OF BELT FILTER WATER TANK

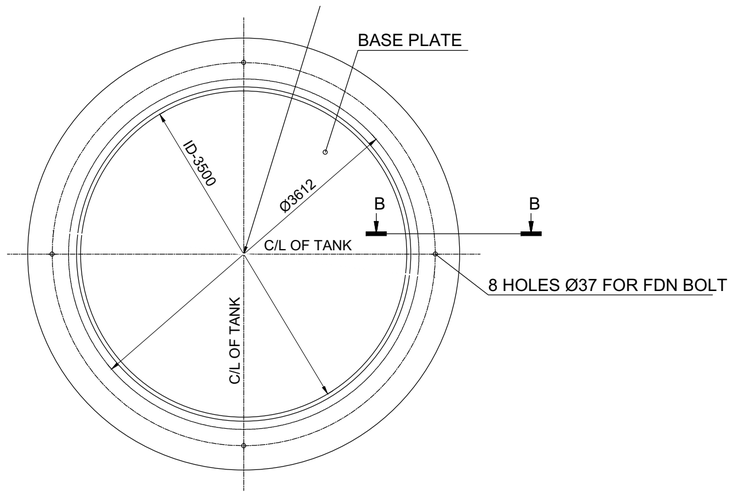
DRAWING NO.	SCALE : NTS	SHEET 2 OF 2	REV 00
SKETCH-08			

SIZE A2

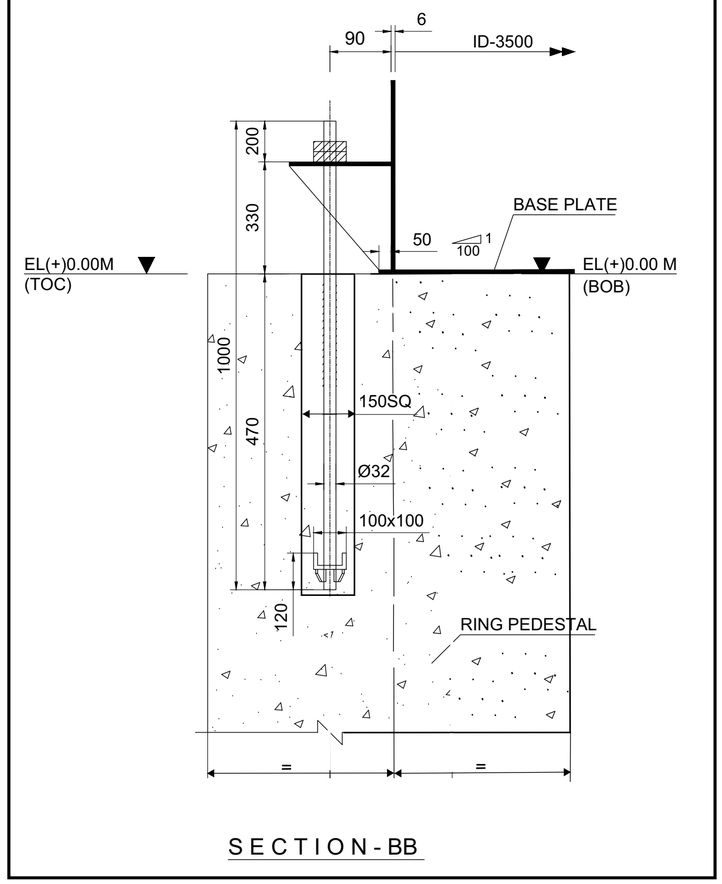
DRAWING NO. 2-FW-000-00400

ALL DIMENSIONS ARE IN MM





VIEW - AA



SECTION-BB

LOAD DATA :

Empty Weight, We (T)	10
Operating Weight, Wo (T)	50
Max Horizontal Force, H (T)	
Due to Wind	3
Due to Seismic	10
Max Moment, M (T-m)	
Due to Wind	6
Due to Seismic (Ringwall Moment)	15

NOTES

01. NON-SHRINK CEMENTITIOUS FLOWABLE GROUT SHALL BE USED FOR GROUTING OF POCKETS AND SHALL BE ONE GRADE HIGHER THAN GRADE OF CONCRETE USED IN FOUNDATION.

02. MINIMUM GRADE OF CONCRETE USED FOR FOUNDATION SHALL BE M25.

03. -VOID

04. -VOID

05. -VOID

06. CIVIL FOUNDATION FOR TANK SHALL BE AS PER IS 803.

LEGEND :

BOS - BOTTOM OF STEEL	BOB - BOTTOM OF BASE PLATE
PCD - PITCH CIRCLE DIAMETER	TOC - TOP OF CONCRETE
T - TONS	PL - PAVEMENT LEVEL
T-M - TONNE METER	[C] - CRITICAL DIMENSION

NUMBER OF TANK (s) = 02

NTPC LTD.
3x660 MW NABINAGAR STPP
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	CHD			
	APPD			

TITLE: FOUNDATION LOADING OF CLARIFIED WATER TANK

DRAWING NO. SKETCH-09 | SCALE : NTS | SHEET 2 OF 2 | REV 00

SIZE A2