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1.	33kV SC TRANSMISSION LINE 1 PLAN & PROFILE AND TOWER SCHEDULE	TCE-7219B-765-RA-6101	7

NTPC DOC. NO. : 0370-572-PVC-C-352

Rev-02

DOC. TITLE: Report of Route survey , tower spotting and transmission line Profile for 33KV S/C transmission line

NABINAGAR POWER GENERATION CO. PVT. LTD.
(A JV OF NTPC LTD. & BIHAR STATE POWER (HOLDING) CO. LTD.)

400/132 kV SWITCHYARD AT NABINAGR STPP (3X660MW)
& 400 KV SWITCHYARD EXTENSION AT NABINAGAR TPP(BRBCL)
NOA Number :CS-0370-572-2-FC-NOA-0009 DATED 12-02-2013



BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION
NEW DELHI

W.O. Number : 81004

**BHARAT HEAVY ELECTRICALS LIMITED
NEW DELHI**

**400kV & 33kV TRANSMISSION LINES AT
NABINAGAR, BIHAR**

**33kV SC TRANSMISSION LINE 1
PLAN & PROFILE AND TOWER SCHEDULE**

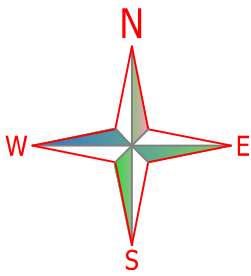
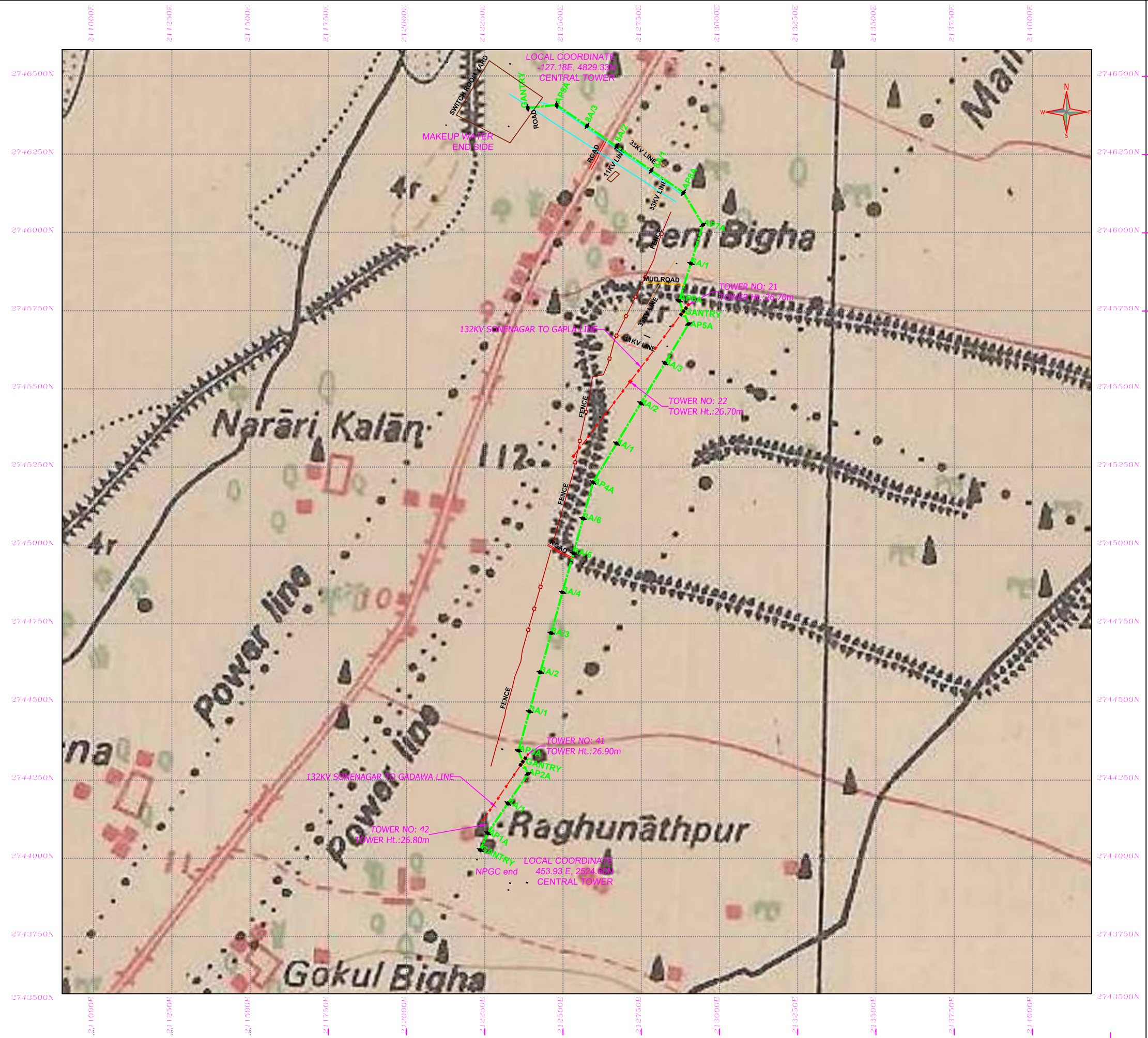
**NTPC DRG. NO: 0370-572-PVC-C-352
TCE DRG. NO: TCE-7219B-765-RA-6101**



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OCTOBER 2014



DETAILED ROUTE SURVEY
PLAN ON TOPO SHEET FOR
33kV SC TRANSMISSION
LINE-1 AT NABINAGAR, BIHAR

TOWER ABSTRACT (LINE 1 - 33 kV SC TRANSMISSION LINE)						
Tower Type\Extn	+0	+3	+6	+9	+12	Total
SA	13	1	0	0	0	14
SB	1	1	0	0	0	2
SC	6	1	0	0	0	7
Total	20	3	0	0	0	23
Gantry	2	0	0	0	0	2

Total Line Length = 2888.95 m
Bee Line Length = 2376.9 m

Total No. of SA Towers = 14
Total No. of SC (including SB) = 9

Height of Normal SA Type = 15.855 m
Height of Normal SC Type = 16.150 m

Height of towers shall be as per calculations

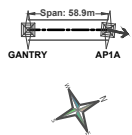
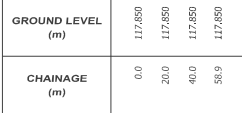
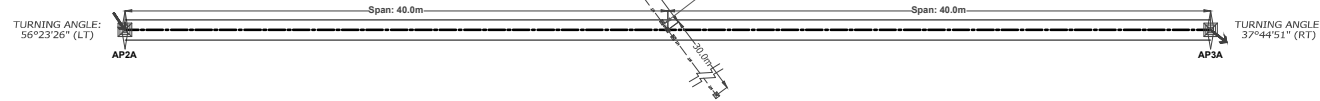
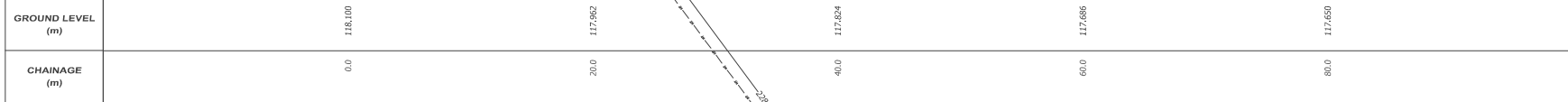
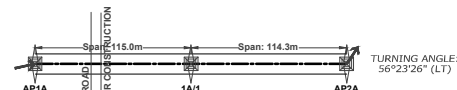
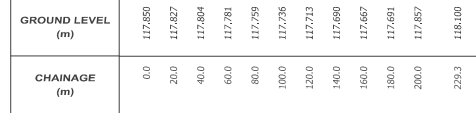
Note: SC Type Towers to be used in place of SB Type Towers

PROJECT : 400 & 33 kV TRANSMISSION LINES AT NABINAGAR, BIHAR																								
CUSTOMER : NABINAGAR POWER GENERATION COMPANY																								
CONTRACTOR : BHARAT HEAVY ELECTRICALS LIMITED																								
CONSULTANT : TATA CONSULTING ENGINEERS LIMITED																								
TOWER SCHEDULE (LINE 1 - 33 kV SINGLE CIRCUIT TRANSMISSION LINE)																								
Sl. No	Twr No.	Tower Type	Deviation Angle (DMS)	Span (m)	Section Length (m)	Chainage (m)	Wind Span (m)	Adjacent Span			Weight Span (Cold)			Weight Span (Hot)			Major Crossings (within 7.5m on either side from Centre Line / Remarks)	UTM Coordinate (Zone - 45)			Spherical Coordinate		Local Coordinates	
								Left	Right	Total	Left	Right	Total	Left	Right	Total		Easting	Northing	Elevation	Longitude	Latitude	Easting	Northing
1	GANTRY	GANTRY			-	0.0	29.5	0.0	58.9	58.9	0.0	-54.6	-54.6	0.0	8.54	8.54	NPGC End, Height of Switchyard take off gantry : 8.0m (Ground Clearance required: 5.35m & Ground Clearance available: 7.85m)	2,12,235.500	27,44,027.000	117.850	84°09'14.5" E	24°47'02.4" N	453.93	2524.60
				58.9																				
2	AP1A	SC+00	11°42'55" (RT)		58.9	58.9	87.0	58.9	115.0	173.9	113.5	60.7	174.2	50.4	58.5	108.9	Dead End Tower (Ground Clearance required: 5.35m & Ground Clearance available: 7.41m)	2,12,259.0	27,44,081.0	117.850	84°09'15.3" E	24°47'04.1" N	459.8	2,583.2
				115.0																				
3	1A/1	SA+00				173.9	114.7	115.0	114.3	229.3	54.3	47.8	102.1	56.5	54.1	110.6	(Ground Clearance required: 5.35m & Ground Clearance available: 7.66m)	2,12,323.610	27,44,176.130	117.720	84°09'17.5" E	24°47'07.3" N	492.18	2693.54
				114.3																				
4	AP2A	SC+00	56°23'26" (LT)		229.3	288.2	77.2	114.3	40.0	154.3	66.5	228.7	295.2	60.2	86.4	146.6	(Ground Clearance required: 5.35m & Ground Clearance available: 7.00m)	2,12,387.840	27,44,270.700	118.100	84°09'19.7" E	24°47'10.4" N	524.40	2803.23
				40.0																				
5	AP2A1	Gnt				328.2	40.0	40.0	40.0	80.0	-193.3	-156.8	-350.1	-31.9	-36.3	-68.2	Gantry Tower HT : 7.00 m 132 kV line crossing (Clearance in between 132 kV & 33 kV conductors required: 3.05m & Clearance available:4.3 m). (Ground Clearance required: 5.35m & Ground Clearance available: 7.0m).	2,12,372.725	27,44,307.734	117.900	84°09'19.1" E	24°47'11.6" N	498.67	2833.86
				40.0													PI refer comments marked on drawing							
6	AP3A	SC+00	37°44'51" (RT)		80.0	368.2	85.0	40.0	130.0	170.0	196.8	69.6	266.4	76.3	66.5	142.8	(Ground Clearance required: 5.35m & Ground Clearance available: 6.75m)	2,12,357.610	27,44,344.770	117.650	84°09'18.6" E	24°47'12.8" N	472.95	2864.49
				130.0																				
7	3A/1	SA+00				498.2	130.0	130.0	130.0	260.0	60.4	68.1	128.5	63.5	66.0	129.5	(Ground Clearance required: 5.35m & Ground Clearance available: 7.41m)	2,12,392.440	27,44,470.020	117.440	84°09'19.7" E	24°47'16.8" N	467.78	2994.39
				130.0																				
8	3A/2	SA+00				628.2	130.0	130.0	130.0	260.0	61.9	68.0	129.9	64.0	66.0	130.0	(Ground Clearance required: 5.35m & Ground Clearance available: 7.41m)	2,12,427.270	27,44,595.260	117.300	84°09'20.9" E	24°47'20.9" N	462.62	3124.28
				130.0																				
9	3A/3	SA+00				758.2	132.5	130.0	135.0	265.0	62.0	70.4	132.4	64.0	68.4	132.4	(Ground Clearance required: 5.35m & Ground Clearance available: 7.22m)	2,12,462.100	27,44,720.510	117.160	84°09'22.0" E	24°47'25.0" N	457.45	3254.18
				135.0																				
10	3A/4	SA+00				893.2	132.5	135.0	130.0	265.0	64.6	68.0	132.6	66.6	66.0	132.6	(Ground Clearance required: 5.35m & Ground Clearance available: 7.41m) Village Road 4 m wide	2,12,498.270	27,44,850.570	117.020	84°09'23.2" E	24°47'29.3" N	452.09	3389.07
				130.0																				
11	3A/5	SA+00				1,023.2	122.5	130.0	115.0	245.0	62.0	60.5	122.5	64.0	58.4	122.4	(Ground Clearance required: 5.35m & Ground Clearance available: 7.92m)	2,12,533.100	27,44,975.820	116.880	84°09'24.3" E	24°47'33.4" N	446.92	3518.97
				115.0																				
12	3A/6	SA+00				1,138.2	117.4	115.0	119.8	234.8	54.5	63.0	117.5	56.6	60.9	117.5	(Ground Clearance required: 5.35m & Ground Clearance available: 7.76m)	2,12,563.910	27,45,086.620	116.760	84°09'25.4" E	24°47'37.0" N	442.35	3633.89
				119.8																				
13	AP4A	SB+00	15°33'17" (RT)		889.8	1,258.0	132.4	119.8	145.0	264.8	56.8	84.4	141.2	58.9	76.3	135.2	(Ground Clearance required: 5.35m & Ground Clearance available: 6.93m)	2,12,596.000	27,45,202.000	116.630	84°09'26.4" E	24°47'40.8" N	437.59	3753.55
				145.0																				
14	4A/1	SA+00				1,403.0	147.5	145.0	150.0	295.0	60.6	79.2	139.8	68.7	76.3	145.0	(Ground Clearance required: 5.35m & Ground Clearance available: 6.63m)	2,12,670.890	27,45,326.160	116.020	84°09'29.0" E	24°47'44.8" N	470.90	3894.67
				150.0																				
15	4A/2	SA+00				1,553.0	150.0	150.0	150.0	300.0	70.9	77.4	148.3	73.7	75.8	149.5	(Ground Clearance required: 5.35m & Ground Clearance available: 6.64m)	2,12,748.360	27,45,454.610	115.800	84°09'31.7" E	24°47'49.1" N	505.35	4040.67
				150.0																				
16	4A/3	SA+00				1,703.0	148.1	150.0	146.1	296.1	72.5	74.8	147.3	74.2	73.6	147.8	(Ground Clearance required: 5.35m & Ground Clearance available: 6.17m)	2,12,825.830	27,45,583.050	115.670	84°09'34.3" E	24°47'53.3" N	539.80	4186.65
				146.1																				

Sl. No	Twr No.	Tower Type	Deviation Angle (DMS)	Span (m)	Section Length (m)	Chainage (m)	Wind Span (m)	Adjacent Span			Weight Span (Cold)			Weight Span (Hot)			Major Crossings (within 7.5m on either side from Centre Line / Remarks)	UTM Coordinate (Zone - 45)			Spherical Coordinate		Local Coordinates	
								Left	Right	Total	Left	Right	Total	Left	Right	Total		Easting	Northing	Elevation	Longitude	Latitude	Easting	Northing
17	AP5A	SC+00	53°18'07" (LT)		591.1	1,849.1	94.9	146.1	43.6	189.7	71.3	214.5	285.8	72.5	83.2	155.7		2,12,901.290	27,45,708.170	115.580	84°09'36.9" E	24°47'57.4" N	573.35	4328.86
				43.6													(Ground Clearance required: 5.35m & Ground Clearance available: 7.0m)							
18	AP5A1	Gnt				1,892.7	40.0	43.6	36.4	80.0	-175.2	-169.8	-345.0	-26.1	-41.7	-67.8	Gantry Tower HT : 7.00 m	2,12,884.810	27,45,748.536	115.360	84°09'36.3" E	24°47'58.7" N	545.31	4362.25
				36.4													132 kV line crossing (Clearance in between 132 kV & 33 kV conductors required: 3.05m & Clearance available: 6.40m). (Ground Clearance required: 5.35m & Ground Clearance available: 7.0m).	PI refer comments marked on drawing						
19	AP6A	SC+00	39°34'43" (RT)		80.0	1,929.1	80.7	36.4	125.0	161.4	206.3	58.9	265.2	65.0	61.3	126.3		2,12,871.050	27,45,782.240	115.030	84°09'35.8" E	24°47'59.8" N	521.90	4390.12
				125.0													(Ground Clearance required: 5.35m & Ground Clearance available: 6.99m)							
20	6A/1	SA+00				2,054.1	127.2	125.0	129.4	254.4	66.1	-2.5	63.7	63.6	43.3	106.9		2,12,908.370	27,45,901.530	115.190	84°09'37.0" E	24°48'03.7" N	520.93	4515.11
				129.4													(Ground Clearance required: 5.35m & Ground Clearance available: 8.16m)							
21	AP7A	SC+03	48°25'03" (LT)		254.4	2,183.4	124.8	129.4	120.2	249.6	131.8	66.0	197.8	86.1	62.0	148.1		2,12,947.000	27,46,025.000	115.260	84°09'38.3" E	24°48'07.7" N	519.92	4644.48
				120.2													33 kV line crossing (Clearance in between 33 kV conductors required: 2.44m & Clearance available: 4.10m). (Ground Clearance required: 5.35m & Ground Clearance available: 10.75m)							
22	AP8A	SB+03	24°17'46" (LT)		120.2	2,303.7	122.6	120.2	125.0	245.2	54.2	61.1	115.3	58.2	62.1	120.3		2,12,885.000	27,46,128.000	115.010	84°09'36.0" E	24°48'11.0" N	429.38	4723.57
				125.0													33 kV 2 no. line crossings (Clearance in between 33 kV conductors required: 2.44m & Clearance available: 3.10m). (Ground Clearance required: 5.35m & Ground Clearance available: 10.61m)							
23	8A/1	SA+03				2,428.7	130.0	125.0	135.0	260.0	63.9	136.0	199.9	62.9	89.3	152.2		2,12,782.180	27,46,199.090	115.070	84°09'32.3" E	24°48'13.3" N	309.74	4759.78
				135.0													11 kV line crossing (Clearance in between 11 kV & 33 kV conductors required: 2.44m & Clearance available: 3.10m). (Ground Clearance required: 5.35m & Ground Clearance available: 8.32m)							
24	8A/2	SA+00				2,563.7	125.0	135.0	115.0	250.0	-1.0	72.8	71.8	45.7	62.4	108.1		2,12,671.130	27,46,275.860	114.800	84°09'28.3" E	24°48'15.7" N	180.52	4798.89
				115.0													(Ground Clearance required: 5.35m & Ground Clearance available: 7.97m) Village Road 7 m wide							
25	8A/3	SA+00				2,678.7	116.2	115.0	117.4	232.4	42.2	128.8	171.0	52.6	81.1	133.7		2,12,576.540	27,46,341.260	114.180	84°09'24.9" E	24°48'17.7" N	70.46	4832.21
				117.4													(Ground Clearance required: 5.35m & Ground Clearance available: 7.99m)							
26	AP9A	SC+00	40°12'56" (LT)		492.5	2,796.1	105.1	117.4	92.8	210.2	-11.4	135.4	124.0	36.4	74.8	111.2	Dead End Tower	2,12,479.890	27,46,407.990	111.270	84°09'21.4" E	24°48'19.8" N	-41.98	4866.16
				92.8													(Ground Clearance required: 5.35m & Ground Clearance available: 6.82m) (Road Clearance required: 5.35m & Proposed Road Clearance available: 7.59m)							
27	GANTRY	GANTRY			92.8	2,888.9	46.4	92.8	0.0	92.8	-42.6	0.0	-42.6	18.1	0.0	18.1	Make-up Water End Side Height of Switchyard take off gantry : 8.0m	2,12,387.500	27,46,399.000	110.100	84°09'18.1" E	24°48'19.5" N	-127.18	4829.33

MARK THESE COORDINATES IN THE 33 KV STRUCTURAL LAYOUT

LOG NO: AP1A	
TOWER TYPE	SC+00 (11°42'55" (RT)
WIND SPAN	(L:58.9+R:115.0)/2=87.0m
WT. SPAN (C)	(L:113.5+R:69.7)=174.2m
WT. SPAN (H)	(L:50.4+R:58.5)=108.9m
LATITUDE	24°47'04.1" N
LONGITUDE	84°09'15.3" E
ELEVATION	117.850

[illegible]

LOC NO: AP3A	
TOWER TYPE	SC+00 (37'44"51" (RT)
WIND SPAN	(L:40.0+R:130.0)/2=85.0m
WT. SPAN (C)	(L:196.8+R:69.6)/2=128.2m
WT. SPAN (H)	(L:76.3+R:66.5)=142.8m
LATITUDE	24°47'12.8" N
LONGITUDE	84°09'18.6" E
ELEVATION	117.650

LOG NO: 3A/2	
OWER TYPE:	SA+00
WIND SPAN:	(L:130.0+R:130.0)/2=130.0m
WT. SPAN (C):	(L:61.3+R:68.0)=129.3m
WT. SPAN (H):	(L:64.0+R:66.0)=130.0m
LATITUDE:	24°47'20.9" N
LONGITUDE:	84°09'20.9" E
ELEVATION:	117.300

LOC NO: 3A/5	
TOWER TYPE	SA+00
WIND SPAN	(L:130.0+R:115.0)/2=122.5m
WT. SPAN (C)	(L:62.0+R:60.5)/2=122.5m
WT. SPAN (H)	(L:64.0+R:58.4)/2=122.4m
LATITUDE	24°47'33.4" N
LONGITUDE	84°09'24.3" E
ELEVATION	116.880

LOC NO: AP4A	
TOWER TYPE	SB+00 (15'33'17" (RT))
WIND SPAN	(L:119.8+R:145.0)/2=132.4m
WT. SPAN (C)	(L:56.8+R:84.4)=141.2m
WT. SPAN (H)	(L:58.9+R:76.3)=135.2m
LATITUDE	24°47'40.8" N
LONGITUDE	84°09'26.4" E
ELEVATION	116.630

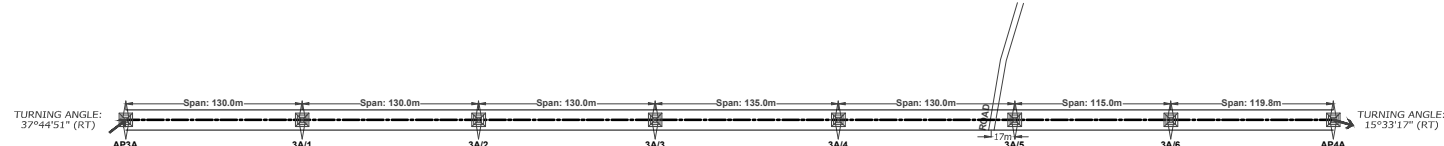
LOC NO: 4A/1	
TOWER TYPE	SA+00
WIND SPAN	(L:145.0+R:150.0)/2=147.5
WT. SPAN (C)	(L:60.6+R:79.2)=139.8m
WT. SPAN (H)	(L:68.7+R:76.3)=145.0m
LATITUDE	24°47'44.8" N
LONGITUDE	84°09'29.0" E
ELEVATION	116.020

150.0m	LOC NO: 4
0m	TOWER TYPE
5m	WIND SPAN (L): 150.0
	WT. SPAN (C): 172.5+
	WT. SPAN (H): 174.2+
	LATITUDE 24°47'53"
	LONGITUDE 84°09'34"
	ELEVATION 115.670

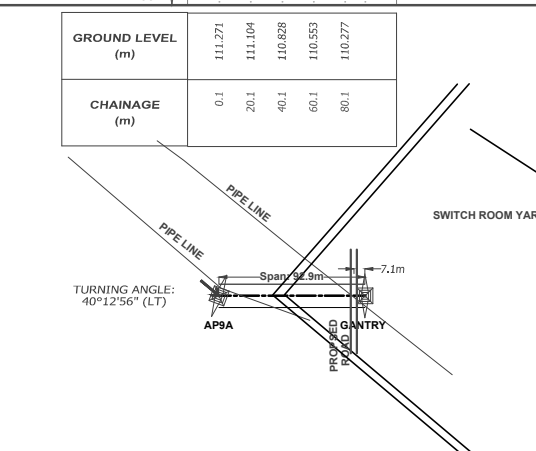
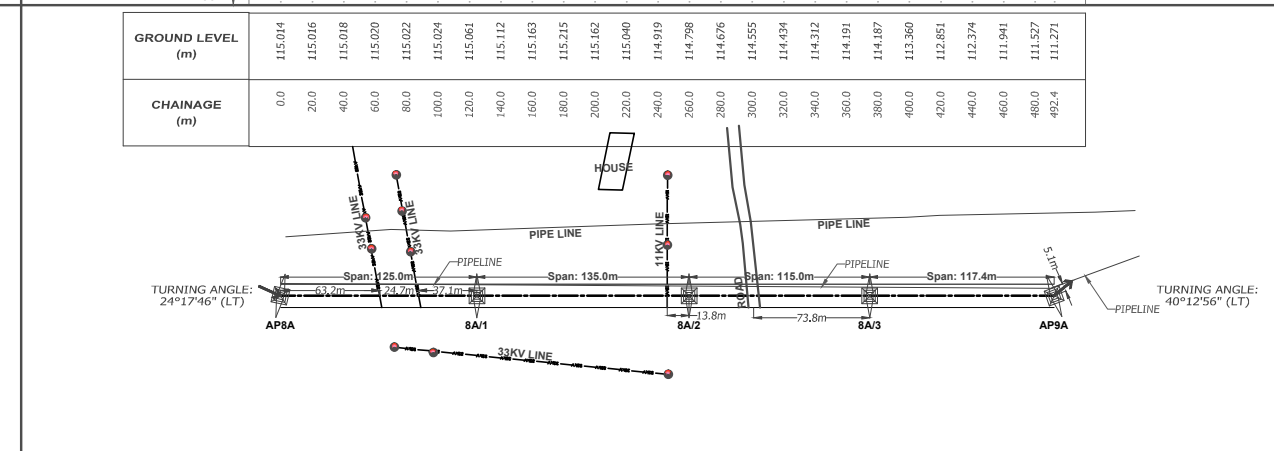
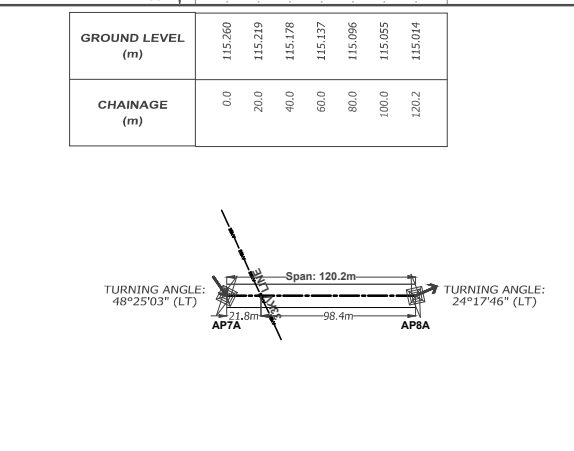
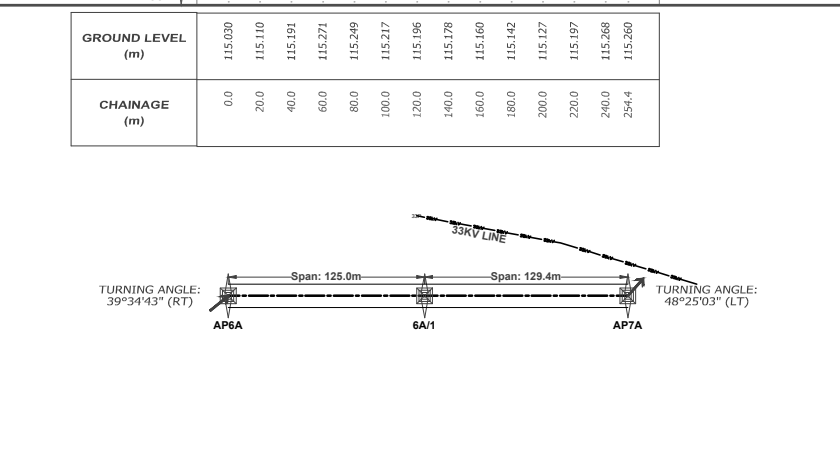
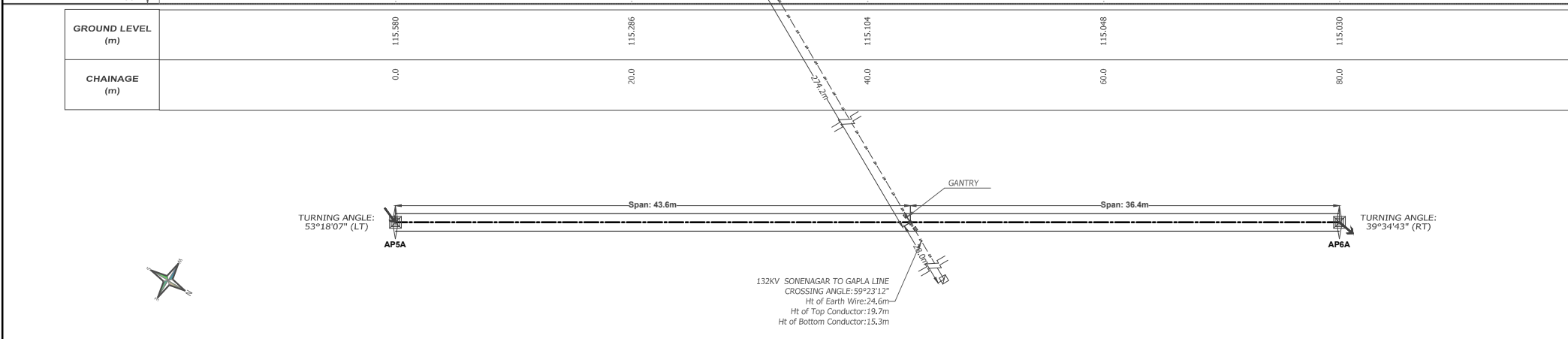
TOWER TYPE	SA-100
LOG NO	3A/2
WIND SPAN	111.36 m (H: 131.50 m x 132.54 m)
WT SPAN	111.36 m (H: 131.50 m x 132.54 m)
WT SPAN	111.36 m (H: 131.50 m x 132.54 m)
LATITUDE	14° 45' 25.0\"
LONGITUDE	14° 09' 22.5\"
ELEVATION	117.169

GROUND LEVEL (m)

CHAINAGE (m)

[illegible]

PLEASE MARK THE EXISTING FACILITIES WITHIN 9 M OF C/L OF TOWERS ALONG THE ROUTE ON BOTH SIDES AND CHECK FOR REQUIRED CLEARANCES.



M/s BHEL to ensure the required clearances as per specification/ standards.