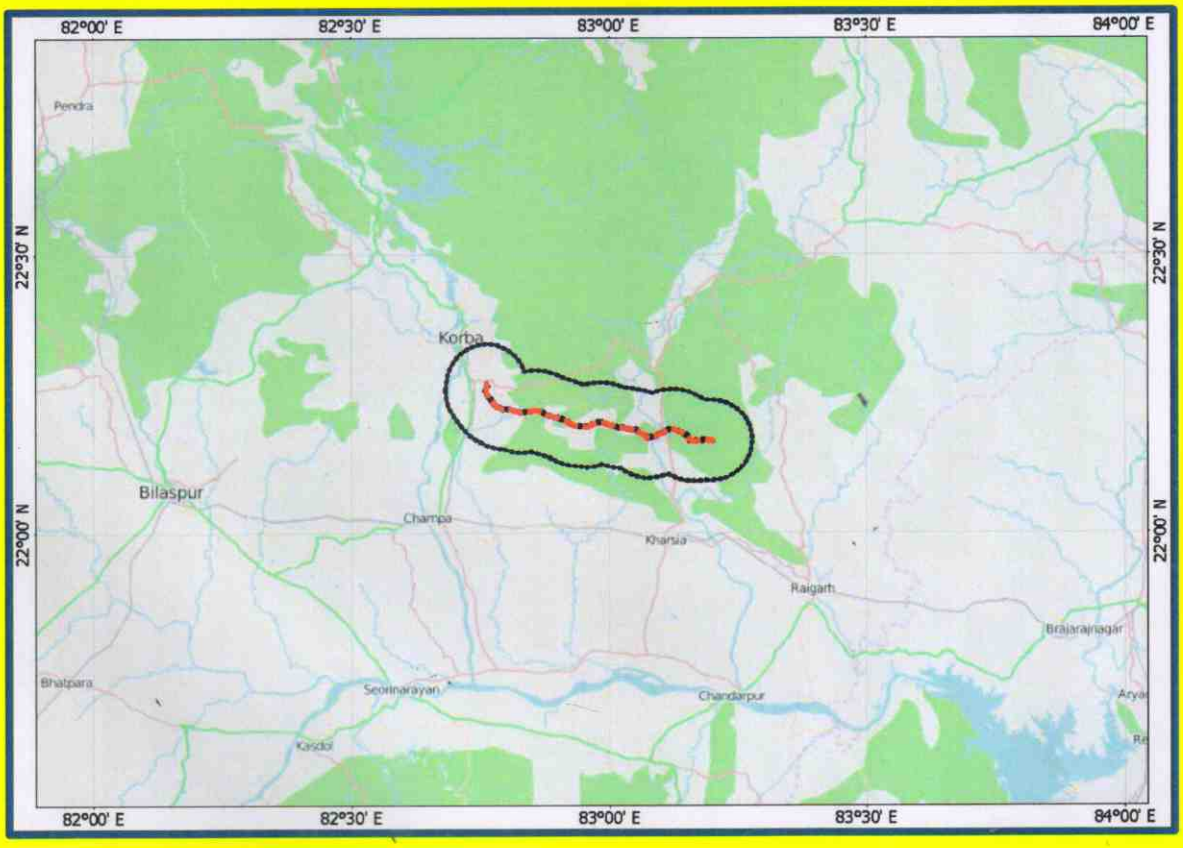
POWERGRID CORPORATION OF INDIA LIMITED

DGPS SURVEYREPORT

for

The proposed 765kV D/C Jharsuguda – Korba Transmission Line (Part-II)



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1. Introduction

Developing countries like India have to invest hugely on infrastructural development. Energy in India has been a primary focus of development in the sub-continent.The Government of India has taken number of electrical projects in particular hydroelectricand thermal power projectsin cooperation with private and public sector companies (PSU).Such generated energy has then been distributed /transmittedacross the states.As part of this infrastructural development, Powergrid Corporation of India Limited**(PGCIL)** planned to construct a 765kV D/C transmission line between Jharsuguda and Dharamjaygarhin the states of Odisha and Chhattisgarh.

In view of the identification of best possible, most suitable,economically least expensive and environment friendly route for construction of transmission line towers in forest area; this DGPS surveyhas been initiated. This activity, i.e selection of transmission line route alignmentfor forest stretch by means of DGPS survey has been awarded to **Ms. Bajaj Electricals Limited.**, by the **Powergrid Corporation of IndiaLimited**

As transmission lines traverse across the country, for evacuation of power from generating stations to load/distribution centers and consuming states,the topographical & geographical nature of the terrains plays significant influence in the project cost and implementation time. Hence, it is essential that at the planning stage itself, various alternative routes and technical solutions for transmission lines to be examined in detail. For undertaking such studies, the major requirement is to obtain adequate information regarding physical constraints, environmental factors, etc. along the route so that optimum solutions are identified. Subsequently, during implementation of the project, it is essential to obtain details about terrain, soil conditions, ground water level, etc. along the route for proper resource planning, costing, etc. as well as reduction in implementation time. In recent times, remote sensing technology is being used in this field by means of satellite imageries and GPS equipments. Using GPS devices, it is possible to navigate any location on the ground with reasonable accuracy up to sub centimeter level.

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2. Scope of Work

Scope of the DGPS Survey work has been defined as below

- Preliminary study of the route by means ofSurvey of India toposheet imageries or by means of forest map
- Identification of all topographical features along the route in the forest section with in specified buffer width
- Drafting final route for forest stretch by means of details collected from maps and from field data
- Optimize the route in forest section through walk over survey (**WOS**)
- Selection of technically viable and economically least expensiveroute

Selected route has the following limitations

- The alignment between entry and exit point of forest sections shall be kept techno – economically feasible, consistent with the features that are encountered
- The number of angle points shall be kept to a minimum
- The route should have minimum number of Power Line crossings (Aerial obstacle)
- Route should be free from special cost zones
- The route should avoid animal/bird sanctuary, reserve coal belt area, oil pipe line/underground inflammable pipe lines, etc.
- The route should be away from restricted areas such as civil and military airfield, it should also avoid aircraft landing approaches

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3. Geography of the Project Area

3.1. Location

Transmission Line for which we have conducted DGPS surveyis falling in the state of Chhattisgarh. Actual site location is surrounded by the following states.

- Jharkhand & Uttar Pradesh(North)
- Odisha (East)
- Andhra Pradesh & Telangana(South)
- Madhya Pradesh & Maharashtra (West)

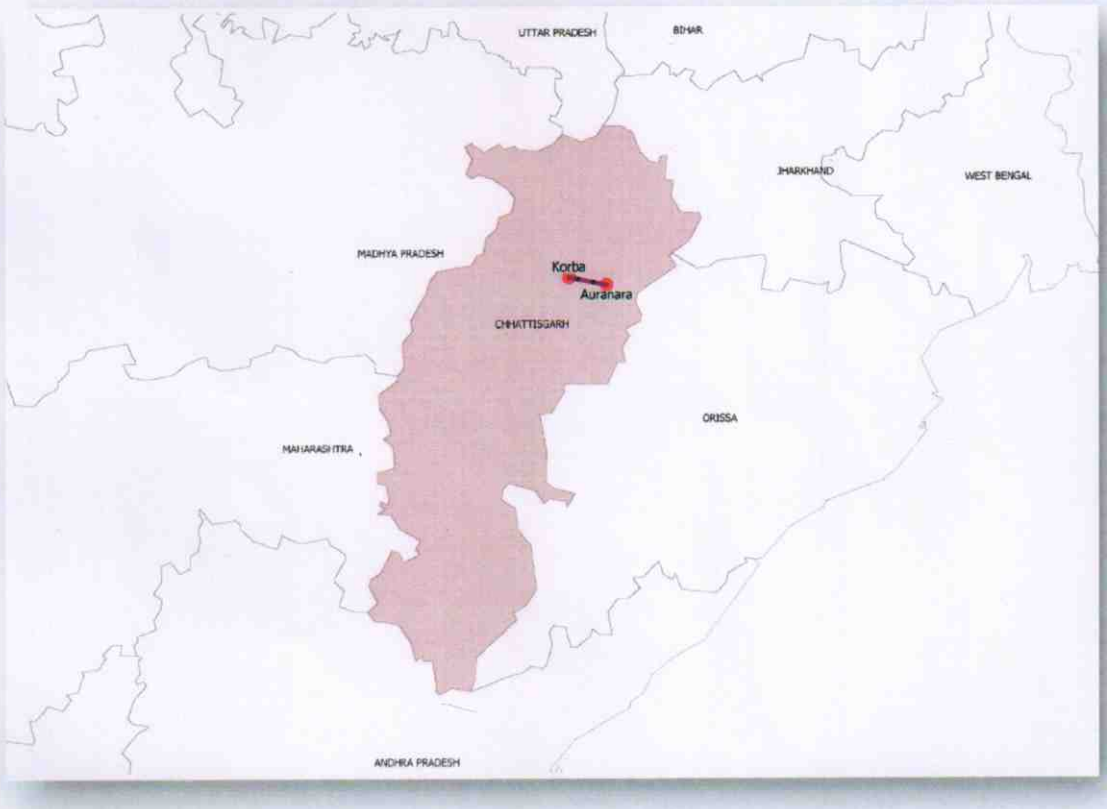

Fig-1:Map showing project location and its surrounding states

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The proposed 765kV D/C transmission starts from Jharsuguda substation and proceeds to Dharamjaygarh substation. Between the terminal locations the alignment passes through the following districts

- Raigarh
- Korba

Toposheets are playing key role during transmission line route alignment surveysince they are being used as the base data. Toposheets are available in different scales/resolutions, i.e Toposheets are available at the following scales

- 1 : 50,000
- 1 : 2,50,000

As a standard practice 1: 50,000 scale toposheets are being used for the purpose of route alignment.

3.2. Terrain

Terrain along the alignment is mostly open with undulations. Undulated forest and non-forest area spotted in Raigarh and Korba districts. Agricultural activities are carried out along the alignment in korba district. In order to minimize forest stretches thealignment is taken away from the bee line.Ground levels along the alignment are varying between 245m to 390m above mean sea level.

3.3. Wind Zone

Wind zone map/ wind speed map serves the primary purpose of choosing the appropriate basic wind velocity for the design of buildings and structures. Indian Metrological Department (IMD) has classified the wind velocity into five zones namely zone-1, zone-2, zone-3, zone-4 and zone-5. Table enclosed in the next page shows respective wind velocity of wind zones

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Sl. No	Wind Zone	Wind Velocity
1	Zone-1	33 m/s
2	Zone-2	39 m/s
3	Zone-3	44 m/s
4	Zone-4	47 m/s
5	Zone-5	50 m/s

The proposed 765kV D/C Jharsuguda - Dharamjaygarh transmission line alignment has fallen under zone-2.

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4. Base Map Preparation

This is the initial phase of the transmission line construction activity. The route alignment survey shall be carried out by either of the below mentioned methodology.

a. **ALTM (Airborne Laser Terrain Modeling)**
b. **Image Processing using high resolution satellite imageries**
c. **Image Processing using Survey of India Topo-sheet imageries**

All of the above mentioned technologies need the base maps to commence the reconnaissance survey. ALTM technology is the most expensive as compared to the other two technologies. So, from the economical point of view, this is not viable.

Image processing technology using satellite imageries also becomes expensive, as procuring the satellite images and processing of the same, have its own overheads.

Survey of India supplied Topo-sheets are available either in paper format or image (digital) format at a nominal price, and processing of these maps becomes much easier and least expensive.

This route alignment survey has been carried out based on **image processing methodology** using Survey of India toposheet imageries.Dedicated software is used for image processing. We used dedicated GIS software called 'Manifold' for the purpose.

4.1. Reconnaissance Survey

Reconnaissance Survey can also be called Recce survey. As any process needs objects, i.e. work can be executed on object/data; here too we need some sort of information to start off the field work. To commence the field work we had been given the coordinates of forest alignment.

Soon after getting the coordinates, the same have been drawn on geo-referenced Survey of India topo-sheet index map. List of toposheet maps required for the project had been prepared and are purchased from SOI (Survey of India).

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Upon purchasing toposheet maps from Survey of India, it has been scanned using high resolution scanners. Geo referencing process will bestarted once we collect scanned toposheet imageries. Geo referencing is nothing but a kind of image transformation whichwill bring the pixel based image into the software, which can correlate the image in spherical / UTM coordinate system.One of the geo-referenced Survey of India toposheet imagery has been shown below.

Fig-2: Geo-referenced topo-sheet imagery

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4.2. DTP (Datum Transformation Parameter)

DTP (Datum Transformation Parameter) is badly needed why because the toposheet imageries are in Everest datum (except open series maps, which are in WGS-84 datum) whereasthe GPS device used for walkover survey is working on WGS-84 datum. So it is necessary to transfer the imageries from Everest to WGS-84 datum to avoid datum shift error.

Following datum transformation parameters (5 parameter transformation) have been used while geo-referencing of the topo-sheets.

- Major axis: 6377301.243
- Inverse Flattening: 300.817
- CenterX: 295
- CenterY: 736
- CenterZ: 257

During geo-referencing process, the above stated five parameters were applied to bring the image from Everest datum to WGS84 datum.

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5. Remote Sensing Technology

Generally, remote sensing refers to the activities of recording/observing/perceiving (sensing) objects or events at far away (remote) places. In remote sensing, the sensors are not in direct contact (**line of sight**) with the objects or events being observed. The information needs a physical carrier to travel from the objects/events to the sensors through an intervening medium. The electromagnetic radiation is normally used as an information carrier in remote sensing. The output of a remote sensing system is usually an imagerepresenting the scene being observed. A further step of image analysis and interpretation is required in order to extract useful/required information from the image. The human visual system is an example of a remote sensing system in this general sense.

In a more restricted sense, remote sensing usually refers to the technology of acquiring information about the earth's surface (land and ocean) and atmosphere using sensors onboard airborne(aircraft, balloons) or spaceborne (satellites, space shuttles) platforms.

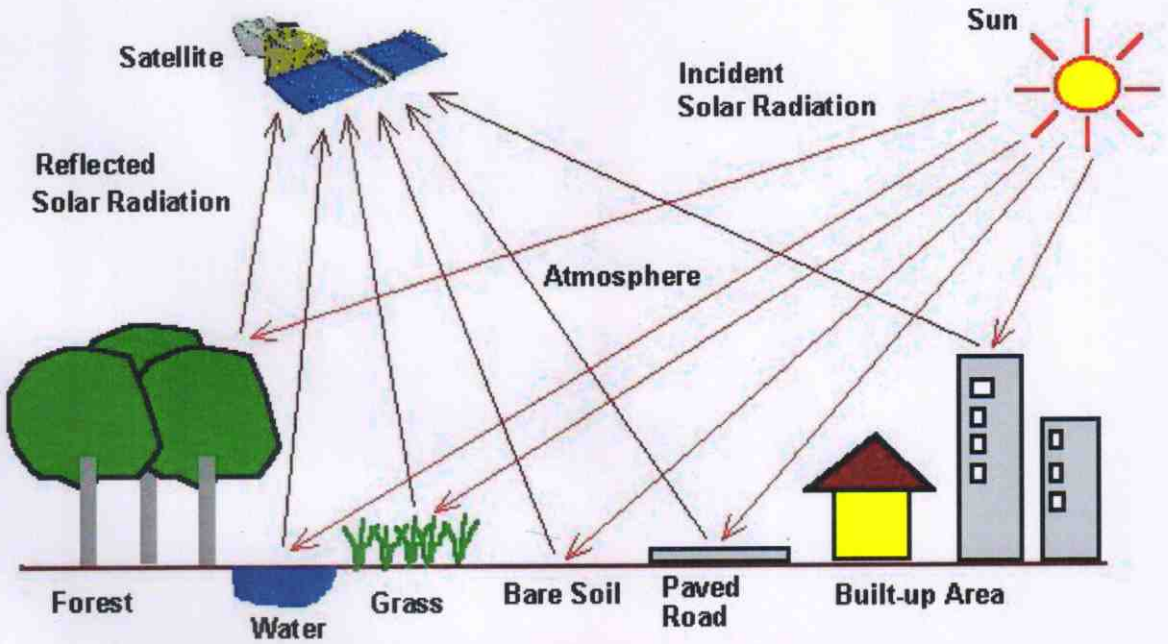

Fig-3: Pictorial representation of remote sensing technology

Optical remote sensing makes use of visible, near infrared and short-waveinfrared sensors to form images of the earth's surface by detecting thesolar radiation reflected from targets on the ground. Different materials reflect and

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absorb differently at different wavelengths. Thus, the targets can be differentiated by their spectral reflectance signatures in the remotely sensed images. Optical remote sensing systems are classified into the following types, depending on the number of spectral bands used in the imaging process.

So far in this section we have discussed about remote sensing technology and now we are going to discuss about the application of remote sensing. The DGPS equipment which we have used to observe the alignment and boundary coordinates of forest area is working on remote sensing technology. The real time coordinates of the ground object is being measured with the help of navigational satellites.

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6. DGPS Survey Methodology

Remote sensing approach is being adopted for DGPS survey. In general practice line of sight is very much required for the object/location to be surveyed from base station, where as in DGPS survey line of sight is not necessary as GPS equipment is working on remote sensing technology. Coordinates of target object is being measured with reference to the base station with the help of navigational satellites.

Below mentioned techniques are commonly adopted for DGPS survey

- Static
- Fast Static
- Kinematic
- Pseudo-kinematic
- Real Time Kinematic

Base Point

Base point is nothing but the master control point which was established with in the vicinity of the project area. If we have the coordinates of already established base point then it is not necessary to observe the base point again.

We have established a base point 'K1' near tower location AP15 for a static observation of over two hours. During the static survey raw data has been logged at 1 Hz interval, upon completion of static survey for base point the data has been post processed in Leica Geo Office software to get the spherical and projected coordinate of the point. This base point coordinate is being used as the reference point for rest of the DGPS survey activity.

Base

One among the DGPS units will be functioned as Base. Base is nothing but stationary unit which will be act as a reference unit and all other DGPS units involved in the survey activity will be operated with reference to the base unit. Spherical/projected coordinate of the known/reference point will be used while setting up the base point.

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Rover

All other moving (from time to time) or non-stationary DPGS units will be called as rover. Coordinates of target points will be calculated by using rover units with reference to the base coordinate and number of available satellites.

DGPS Survey

As we have already discussed the static observation was post processed through single point processing (SPP) methodology using LGO software. Such processed coordinate was used as reference point for further survey activity. All forest entry and exit points and other reference points were observed by static survey for one hour observation. Tower locations and forest corridor points have been surveyed through real time kinematic methodology. In this RTK survey radio modem will be used to send the radio corrections to calculate real time coordinates.

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7. Survey Points

DGPS coordinates for base point, reference point and tower location has been enclosed as below. Spherical as well as UTM coordinates enclosed for your ready reference.

7.1. Base Point Coordinates

Point-ID : **K1**
Easting (m) : **693,858.815**
Northing (m) : **2,457,399.021**
Elevation (m) : **330.816**
Longitude : **82°52'50.35" E**
Latitude : **22°12'40.06" N**

7.2. Reference Point Coordinates

Sl. No	Reference Pnt	UTM Coordinate (Zone-44Q)		Spherical Coordinate		Elevation (m)
		Easting	Northing	Longitude	Latitude	
1	K2	695,972.041	2,456,912.144	82°54'03.90"E	22°12'23.37"N	323.570
2	K3	697,198.005	2,456,488.362	82°54'46.51"E	22°12'09.10"N	326.414
3	K4	698,786.170	2,455,656.330	82°55'41.58"E	22°11'41.40"N	318.913
4	K5	701,718.286	2,455,171.620	82°57'23.71"E	22°11'24.42"N	299.786
5	K6	702,905.979	2,455,808.794	82°58'05.45"E	22°11'44.63"N	304.642
6	K7	702,852.871	2,455,744.908	82°58'03.57"E	22°11'42.58"N	304.941
7	K8	702,829.266	2,455,794.587	82°58'02.77"E	22°11'44.20"N	305.094
8	K9	703,961.732	2,456,203.721	82°58'42.48"E	22°11'57.02"N	296.034
9	K10	705,984.365	2,455,864.793	82°59'52.92"E	22°11'45.14"N	285.147
10	K11	708,120.235	2,455,159.438	83°01'07.14"E	22°11'21.30"N	268.212
11	K12	709,101.660	2,455,178.153	83°01'41.40"E	22°11'21.48"N	264.118
12	K14	710,698.665	2,454,773.704	83°02'36.95"E	22°11'07.64"N	265.533
13	K15	710,707.526	2,454,657.923	83°02'37.21"E	22°11'03.87"N	268.138
14	K17	711,795.829	2,454,561.618	83°03'15.14"E	22°11'00.26"N	272.684
15	K18	712,493.809	2,454,046.813	83°03'39.26"E	22°10'43.22"N	261.593
16	K19	715,311.737	2,453,506.374	83°05'17.34"E	22°10'24.40"N	240.855
17	K20	716,415.917	2,454,085.664	83°05'56.15"E	22°10'42.74"N	239.408
18	K21	716,886.805	2,454,051.631	83°06'12.56"E	22°10'41.42"N	237.912
19	K22	716,811.112	2,454,043.444	83°06'09.92"E	22°10'41.19"N	240.447
20	K22A	716,908.311	2,454,157.283	83°06'13.36"E	22°10'44.84"N	237.698

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Sl. No	Reference Pnt	UTM Coordinate (Zone-44Q)		Spherical Coordinate		Elevation (m)
		Easting	Northing	Longitude	Latitude	
21	T2	686,969.619	2,458,394.961	82°48'50.26"E	22°13'15.16"N	304.178
22	T3	686,942.939	2,458,336.537	82°48'49.30"E	22°13'13.27"N	298.484
23	T6	693,867.274	2,457,431.629	82°52'50.65"E	22°12'41.11"N	327.521
24	T7	693,864.804	2,457,474.758	82°52'50.59"E	22°12'42.52"N	324.347
25	T7A	693,835.745	2,457,584.348	82°52'49.62"E	22°12'46.09"N	329.717
26	ST1	727,036.840	2,452,975.819	83°12'06.21"E	22°10'01.77"N	314.602
27	ST2	727,146.116	2,452,878.295	83°12'09.97"E	22°09'58.55"N	312.381

7.3. TowerLocationCoordinates

Sl. No	Loc Name	Seq. No	UTM Coordinate (Zone-44Q)		Spherical Coordinate		Elevation (m)
			Easting	Northing	Longitude	Latitude	
1	AP42	58	726,951.778	2,452,899.602	83°12'03.203" E	22°09'59.337" N	313.559
2	AP41	59	725,828.575	2,452,894.189	83°11'24.010" E	22°09'59.689" N	306.373
3	AP40	60	725,463.183	2,452,958.470	83°11'11.293" E	22°10'01.950" N	298.613
4	AP37	62	723,533.340	2,452,694.154	83°10'03.824" E	22°09'54.259" N	284.180
5	AP36	63	722,367.160	2,452,772.221	83°09'23.172" E	22°09'57.336" N	275.373
6	AP35	64	721,769.297	2,453,776.081	83°09'02.808" E	22°10'30.238" N	271.415
7	AP34	65	720,056.457	2,454,651.053	83°08'03.467" E	22°10'59.461" N	256.425
8	AP33B	66	719,628.081	2,454,688.410	83°07'48.536" E	22°11'00.871" N	256.363
9	AP33A	67	719,327.081	2,454,999.051	83°07'38.184" E	22°11'11.105" N	250.806
10	AP33	68	718,150.953	2,454,969.615	83°06'57.125" E	22°11'10.683" N	242.741
11	AP32	69	716,872.913	2,454,090.573	83°06'12.097" E	22°10'42.690" N	237.262
12	AP31	70	716,425.920	2,454,053.679	83°05'56.481" E	22°10'41.692" N	239.811
13	AP30	71	715,410.016	2,453,423.541	83°05'20.726" E	22°10'21.667" N	235.138
14	AP29	72	713,889.164	2,453,124.403	83°04'27.512" E	22°10'12.623" N	242.425
15	AP28	73	713,230.285	2,453,868.652	83°04'04.874" E	22°10'37.105" N	249.464
16	AP27	74	712,115.947	2,454,280.898	83°03'26.181" E	22°10'50.996" N	270.426
17	AP26	75	711,880.796	2,454,665.829	83°03'18.157" E	22°11'03.611" N	270.516
18	AP25	76	711,457.216	2,454,785.164	83°03'03.430" E	22°11'07.676" N	267.766
19	RT2	76LT1	711,228.548	2,454,748.674	83°02'55.433" E	22°11'06.591" N	273.923
20	RT1	76LT2	710,954.154	2,454,735.331	83°02'45.850" E	22°11'06.278" N	269.843
21	LT2	76RT1	711,185.499	2,454,874.439	83°02'53.990" E	22°11'10.697" N	270.412
22	LT1	76RT2	710,915.196	2,454,843.090	83°02'44.541" E	22°11'09.797" N	266.385
23	AP24	77	710,570.635	2,454,810.372	83°02'32.501" E	22°11'08.885" N	257.329
24	AP23	77A	709,216.237	2,455,199.778	83°01'45.414" E	22°11'22.132" N	258.750
25	AP22	78	708,135.936	2,455,116.522	83°01'07.671" E	22°11'19.895" N	266.626
26	AP20	79	705,192.927	2,456,103.946	82°59'25.408" E	22°11'53.255" N	291.534

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Sl. No	Loc Name	Seq. No	UTM Coordinate (Zone-44Q)		Spherical Coordinate		Elevation (m)
			Easting	Northing	Longitude	Latitude	
27	AP19A	79A	704,006.566	2,456,170.304	82°58'44.029" E	22°11'55.916" N	293.364
28	AP19	80	702,868.846	2,455,789.884	82°58'04.144" E	22°11'44.032" N	304.611
29	AP18	81	701,853.957	2,455,162.817	82°57'28.438" E	22°11'24.077" N	298.015
30	AP17	82	699,178.919	2,455,470.328	82°55'55.207" E	22°11'35.188" N	313.348
31	AP16	83	696,736.320	2,456,750.670	82°54'30.512" E	22°12'17.812" N	324.696
32	AP15	84	693,696.458	2,457,504.853	82°52'44.723" E	22°12'43.562" N	329.909
33	AP13	85	692,694.699	2,458,139.159	82°52'10.025" E	22°13'04.584" N	342.912
34	AP12A	85A	692,010.831	2,458,397.850	82°51'46.261" E	22°13'13.266" N	351.522
35	AP12	86	691,636.476	2,458,483.399	82°51'33.228" E	22°13'16.197" N	364.921
36	AP11B	86A	691,262.860	2,458,451.732	82°51'20.171" E	22°13'15.316" N	403.582
37	AP11A	86B	690,921.533	2,458,370.047	82°51'08.219" E	22°13'12.797" N	375.019
38	AP11	87	690,587.052	2,458,325.076	82°50'56.523" E	22°13'11.468" N	378.769
39	AP10B	87A	690,087.996	2,458,041.449	82°50'38.979" E	22°13'02.446" N	345.886
40	AP10A	88	689,285.932	2,458,109.206	82°50'11.006" E	22°13'04.965" N	324.411
41	AP10	89	688,531.297	2,457,843.528	82°49'44.548" E	22°12'56.626" N	312.730
42	AP9	90	688,062.711	2,458,083.518	82°49'28.289" E	22°13'04.611" N	312.324
43	AP8	91	686,273.641	2,458,531.241	82°48'26.014" E	22°13'19.862" N	309.102
44	AP7A	92	685,154.597	2,458,651.629	82°47'46.994" E	22°13'24.209" N	304.594
45	AP7	93	684,953.817	2,458,576.147	82°47'39.953" E	22°13'21.832" N	300.505
46	AP6	94	683,250.285	2,459,423.278	82°46'40.822" E	22°13'50.024" N	300.170
47	AP5	95	681,454.286	2,461,869.713	82°45'39.106" E	22°15'10.235" N	290.549
48	AP4	96	681,373.870	2,462,284.761	82°45'36.466" E	22°15'23.758" N	296.758
49	AP3	97	681,542.589	2,462,662.142	82°45'42.512" E	22°15'35.962" N	296.632
50	AP2	98	681,656.197	2,463,064.428	82°45'46.643" E	22°15'48.996" N	303.067
51	AP1	99	681,598.675	2,463,459.357	82°45'44.795" E	22°16'01.856" N	300.406

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R.O. Kanpur

वनमण्डलाधिकारी
कोरबा वनमण्डल कोरबा (छ.ग.)

8. Maps

Fig-4: Route Map

एम. एच. सिद्दीकी/M. H. SIDDIQUI
वरिष्ठ अभियंता/SENIOR ENGINEER
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9. EquipmentsUsed

Below mentioned list of equipments used for the field work

1. DGPS
    a. GS14 Antenna – 2nos
    b. CS10 Field Controller – 2nos
2. GPS
    a. eTrex30 – 1no
3. Software
    a. Manifold – For Geo-referencing and GIS activities
    b. AutoCad – For preparation of final route map
    c. MS Office – To prepare reports
    d. Leica Geo Office 8.4 – To process DGPS data

Fig-5: Leica GS14 Smart Antenna

Fig-6: Leica CS10 Field Controller

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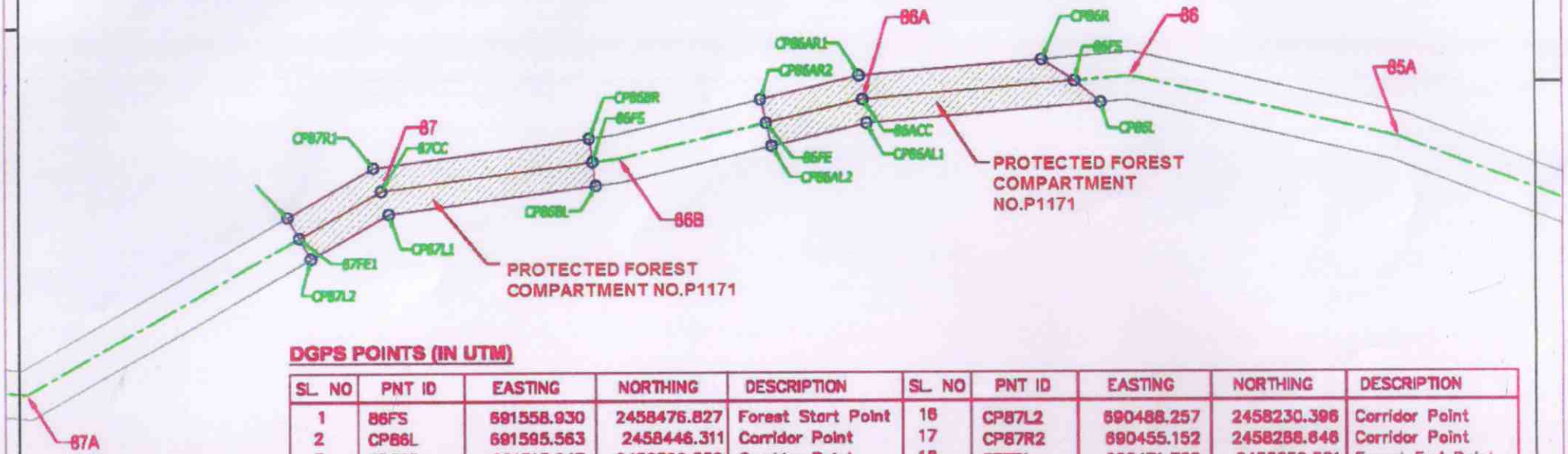
वरिष्ठ अभियंता/SENIOR ENGINEER
पावरग्रिड, कोरबा/POWERGRID, KORBA

MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765KV D/C JHARSUGUDA-DHARAMJAYGARH TR.LINE- II (CKT-3&4)
VILLAGE-AOURAI, DIST-KORBA, STATE-CHATTISGARH
PROTECTED FOREST COMPARTMENT NO.- P1171, TOTAL AREA- 5.8022 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION	SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	86FS	691558.930	2458476.827	Forest Start Point	16	CP87L2	690488.257	2458230.396	Corridor Point
2	CP86L	691595.563	2458446.311	Corridor Point	17	CP87R2	690455.152	2458288.646	Corridor Point
3	CP86R	691513.047	2458506.558	Corridor Point	18	87FE1	690471.705	2458259.521	Forest End Point
4	CP86AL1	691268.203	2458418.565	Corridor Point	19	87FS2	690471.705	2458259.521	Forest Start Point
5	86ACC	691282.860	2458451.732	Tower Point	20	CP87L2	690488.257	2458230.396	Corridor Point
6	CP86AR1	691257.516	2458484.899	Corridor Point	21	CP87R2	690455.152	2458288.646	Corridor Point
7	CP86AL2	691135.467	2458386.799	Corridor Point	22	CP87L3	690163.131	2458045.616	Corridor Point
8	CP86AR2	691119.873	2458451.959	Corridor Point	23	CP87R3	690130.025	2458103.866	Corridor Point
9	86FE	691127.670	2458419.379	Forest End Point	24	87FE2	690148.578	2458074.743	Forest End Point
10	86FS	690884.000	2458365.000	Forest Start Point					
11	CP86BL	690888.464	2458331.799	Corridor Point					
12	CP86BR	690879.536	2458398.201	Corridor Point					
13	CP87L1	690597.955	2458292.741	Corridor Point					
14	87CC	690587.052	2458325.076	Tower Point					
15	CP87R1	690576.148	2458357.412	Corridor Point					

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ASSTT. G.M. (S.S. & TLC)
पॉवर ग्रिड, कोरबा / POWER GRID, KORBA

Sheet 8 of 9

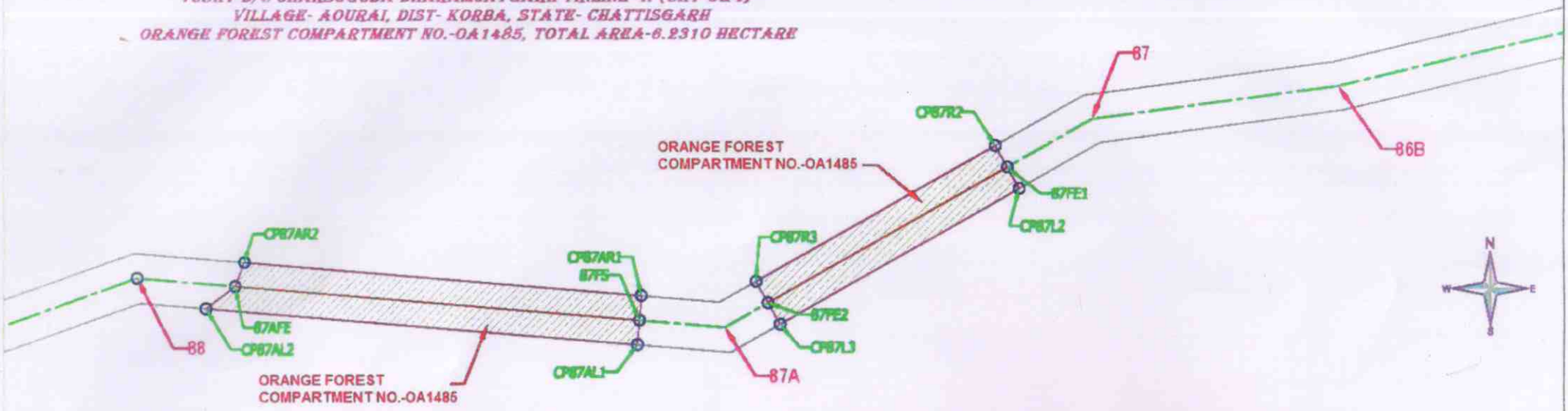
Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)
750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor:
BAJAJ ELECTRICALS LIMITED
Rustomjee Aspiree, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East), Mumbai-400 022 (INDIA)
Mob : +91 8879656978 / 9560686978 : Tel : 022 24064000

Client:
POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765KV D/C JHARSUGUDA-DHARAMJAYGARH TR.LINE -II (CKT-3&4)
VILLAGE- AOURAI, DIST- KORBA, STATE- CHATTISGARH
ORANGE FOREST COMPARTMENT NO.-OA1485, TOTAL AREA-6.2310 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	87FS	689971.937	2458051.254	Forest Start Point
2	CP87AL1	689969.117	2458017.872	Corridor Point
3	CP87AR1	689974.757	2458084.635	Corridor Point
4	CP87AL2	689379.258	2458067.703	Corridor Point
5	CP87AR2	689431.991	2458130.487	Corridor Point
6	87AFE	689419.165	2458097.951	Forest End Point
7	87FE1	690471.705	2458259.521	Forest End Point
8	CP87L2	690488.257	2458230.396	Corridor Point
9	CP87R2	690455.152	2458288.646	Corridor Point
10	CP87L3	690163.131	2458045.618	Corridor Point
11	CP87R3	690130.025	2458103.868	Corridor Point
12	87FE2	690146.578	2458074.743	Forest End Point

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पॉवर ग्रिड, कोरबा / POWER GRID, KORBA

Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)
750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor:
BAJAJ ELECTRICALS LIMITED
Rustomjee Aspiree, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East)- Mumbai -400 022 (INDIA)
Mob : +91 8879656978 / 9560686978 : Tel : 022-24064000

Client:
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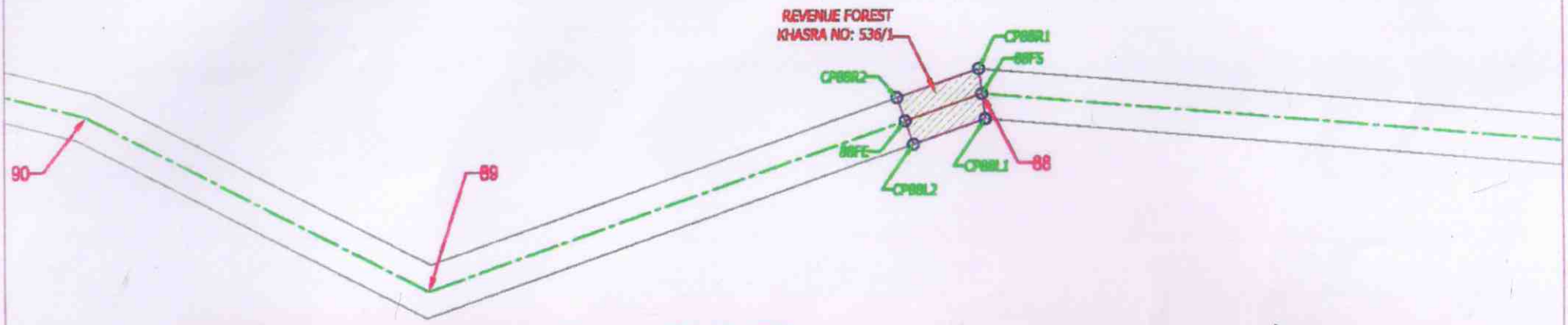
MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765KV D/C JHARSUGUDA-DHARAMJAYGARH TR.LINE-II (CKT-3&4)
VILLAGE-AOURAI, DIST- KORBA, STATE- CHATTISGARH
REVENUE FOREST KHASRA NO.-536/1. TOTAL AREA- 0.7370 HECTARE



DGPS POINTS REVENUE FOREST KHASRA NO. - 536/1(IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	88FS	689285.932	2458109.206	Forest Start Point
2	CP88L1	689290.276	2458075.220	Corridor Point
3	CP88R1	689281.589	2458143.192	Corridor Point
4	CP88L2	689192.932	2458040.949	Corridor Point
5	CP88R2	689170.682	2458104.146	Corridor Point
6	88FE	689181.807	2458072.548	Forest End Point

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ASSTT [illegible] (TLC)
पॉवर ग्रिड, कोरबा / POWER GRID, KORBA

Sheet 9 of 9

Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)

750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor: BAJAJ ELECTRICALS LIMITED
Rustomjee Aspree, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East), Mumbai -400 022 (INDIA)
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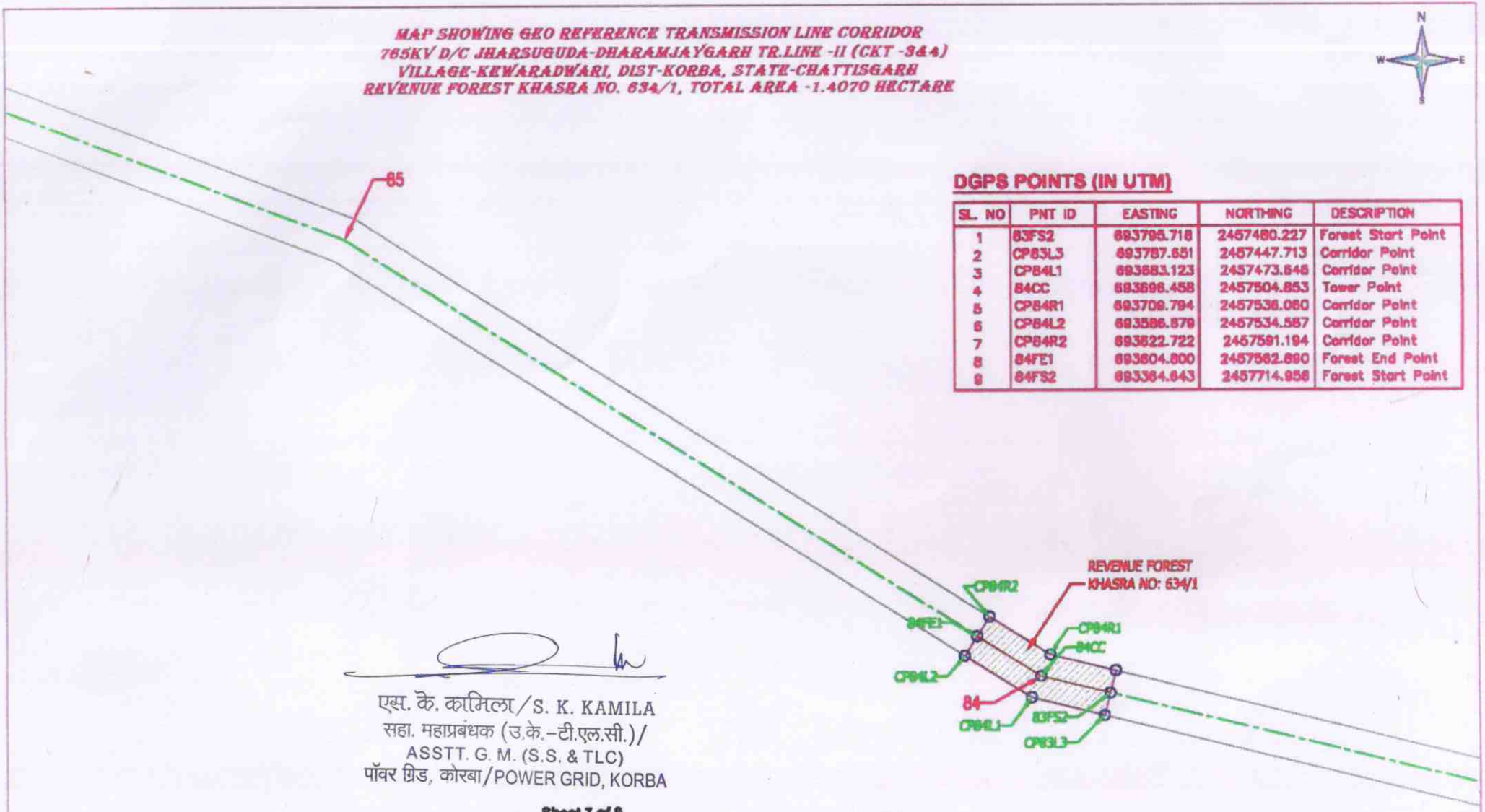
Client: POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765KV D/C JHARSUGUDA-DHARAMJAYGARH TR.LINE -II (CKT -3&4)
VILLAGE-KEWARADWARI, DIST-KORBA, STATE-CHATTISGARH
REVENUE FOREST KHASRA NO. 634/1, TOTAL AREA -1.4070 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	83FS2	693795.718	2457480.227	Forest Start Point
2	CP83L3	693787.651	2457447.713	Corridor Point
3	CP84L1	693683.123	2457473.646	Corridor Point
4	84CC	693696.458	2457504.853	Tower Point
5	CP84R1	693709.794	2457536.060	Corridor Point
6	CP84L2	693586.879	2457534.587	Corridor Point
7	CP84R2	693822.722	2457591.194	Corridor Point
8	84FE1	693804.800	2457562.890	Forest End Point
9	84FS2	693364.643	2457714.956	Forest Start Point

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ASSTT. G. M. (S.S. & TLC)
पॉवर ग्रिड, कोरबा/POWER GRID, KORBA

Sheet 7 of 8

Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)

750m 675 600 525 450 375 300 225 150 75 0 75 150m

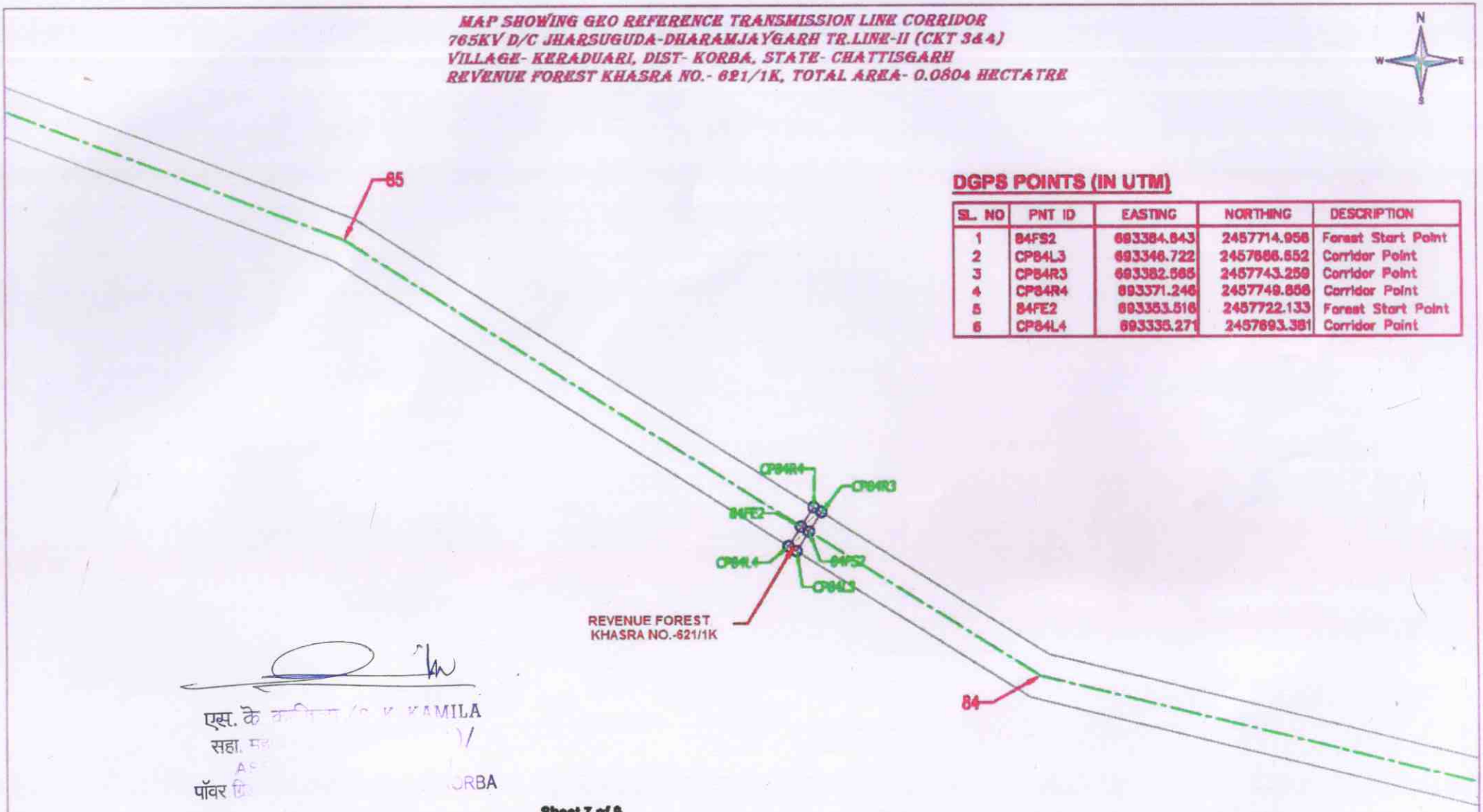
Contractor:

BAJAJ ELECTRICALS LIMITED
Rustomjee Aspree, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East) Mumbai -400 022 (INDIA)
Mob : +91 8879656978 / 9560686978 : Tel : 022-24064000

Client:

POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765KV D/C JHARSUGUDA-DHARAMJAYGARH TR.LINE-II (CKT 3&4)
VILLAGE- KERADUARI, DIST- KORBA, STATE- CHATTISGARH
REVENUE FOREST KHASRA NO.- 621/1K, TOTAL AREA- 0.0804 HECTATRE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	84FS2	693384.643	2457714.956	Forest Start Point
2	CP84L3	693346.722	2457686.552	Corridor Point
3	CP84R3	693382.565	2457743.259	Corridor Point
4	CP84R4	693371.246	2457749.656	Corridor Point
5	84FE2	693353.516	2457722.133	Forest Start Point
6	CP84L4	693335.271	2457693.381	Corridor Point

एस. के [illegible] /S. K. KAMILA
सहा. [illegible]
पॉवर [illegible] ORBA

Sheet 7 of 8

Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)

750m 675 600 525 450 375 300 225 150 75 0 75 150m

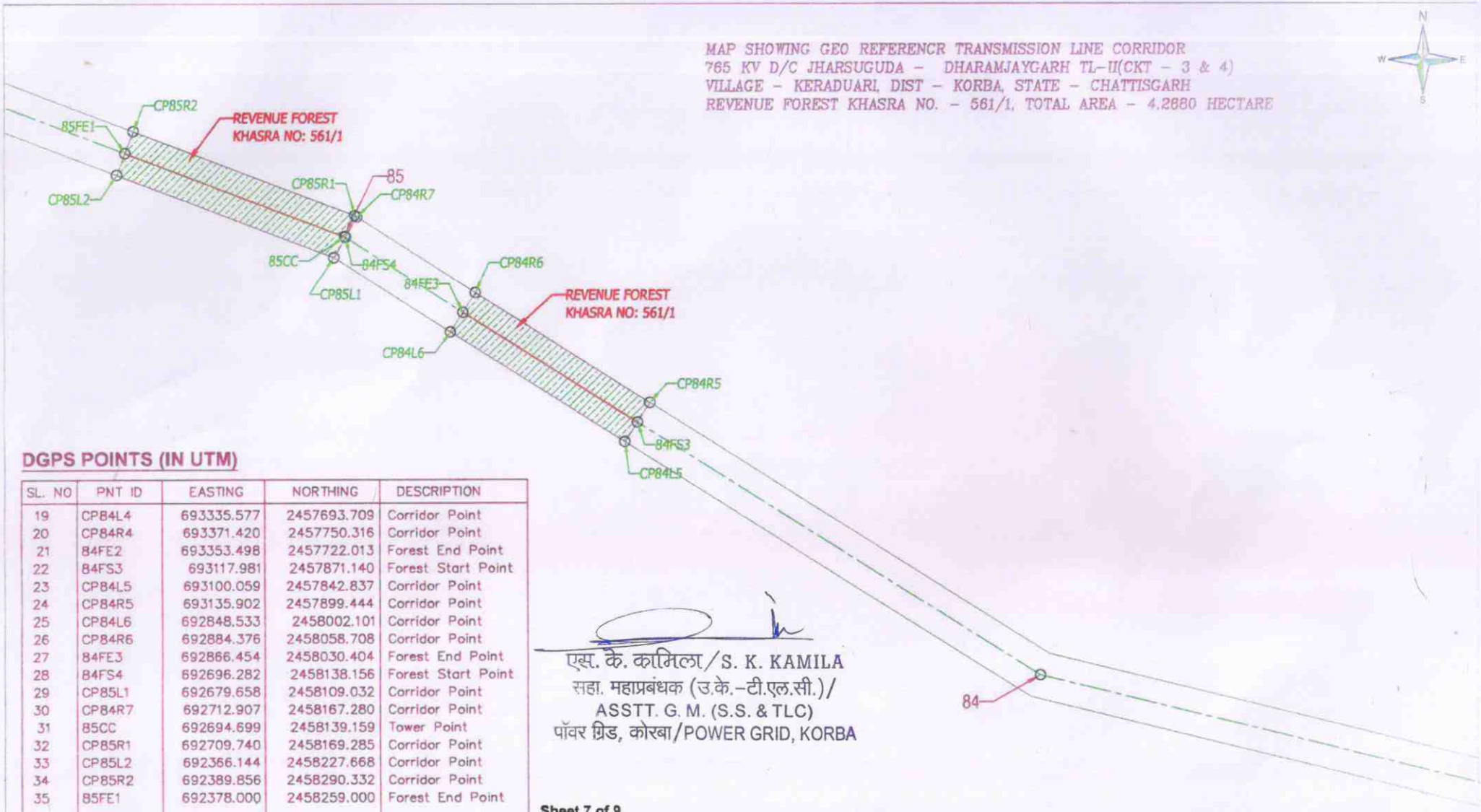
Contractor:

BAJAJ ELECTRICALS LIMITED
Rustomjee Aspire, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East) - Mumbai - 400 022 (INDIA)
Mob : +91 8879656978 / 9560686978 ; Tel: 022-24064000

Client:

POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCR TRANSMISSION LINE CORRIDOR
765 KV D/C JHARSUGUDA – DHARAMJAYGARH TL-II(CKT – 3 & 4)
VILLAGE – KERADUARI, DIST – KORBA, STATE – CHATTISGARH
REVENUE FOREST KHASRA NO. – 561/1, TOTAL AREA – 4.2680 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
19	CP84L4	693335.577	2457693.709	Corridor Point
20	CP84R4	693371.420	2457750.316	Corridor Point
21	84FE2	693353.498	2457722.013	Forest End Point
22	84FS3	693117.981	2457871.140	Forest Start Point
23	CP84L5	693100.059	2457842.837	Corridor Point
24	CP84R5	693135.902	2457899.444	Corridor Point
25	CP84L6	692848.533	2458002.101	Corridor Point
26	CP84R6	692884.376	2458058.708	Corridor Point
27	84FE3	692866.454	2458030.404	Forest End Point
28	84FS4	692696.282	2458138.156	Forest Start Point
29	CP85L1	692679.658	2458109.032	Corridor Point
30	CP84R7	692712.907	2458167.280	Corridor Point
31	85CC	692694.699	2458139.159	Tower Point
32	CP85R1	692709.740	2458169.285	Corridor Point
33	CP85L2	692366.144	2458227.668	Corridor Point
34	CP85R2	692389.856	2458290.332	Corridor Point
35	85FE1	692378.000	2458259.000	Forest End Point

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ASSTT. G. M. (S.S. & TLC)
पॉवर ग्रिड, कोरबा/POWER GRID, KORBA

Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)

750m 675 600 525 450 375 300 225 150 75 0 75 150m

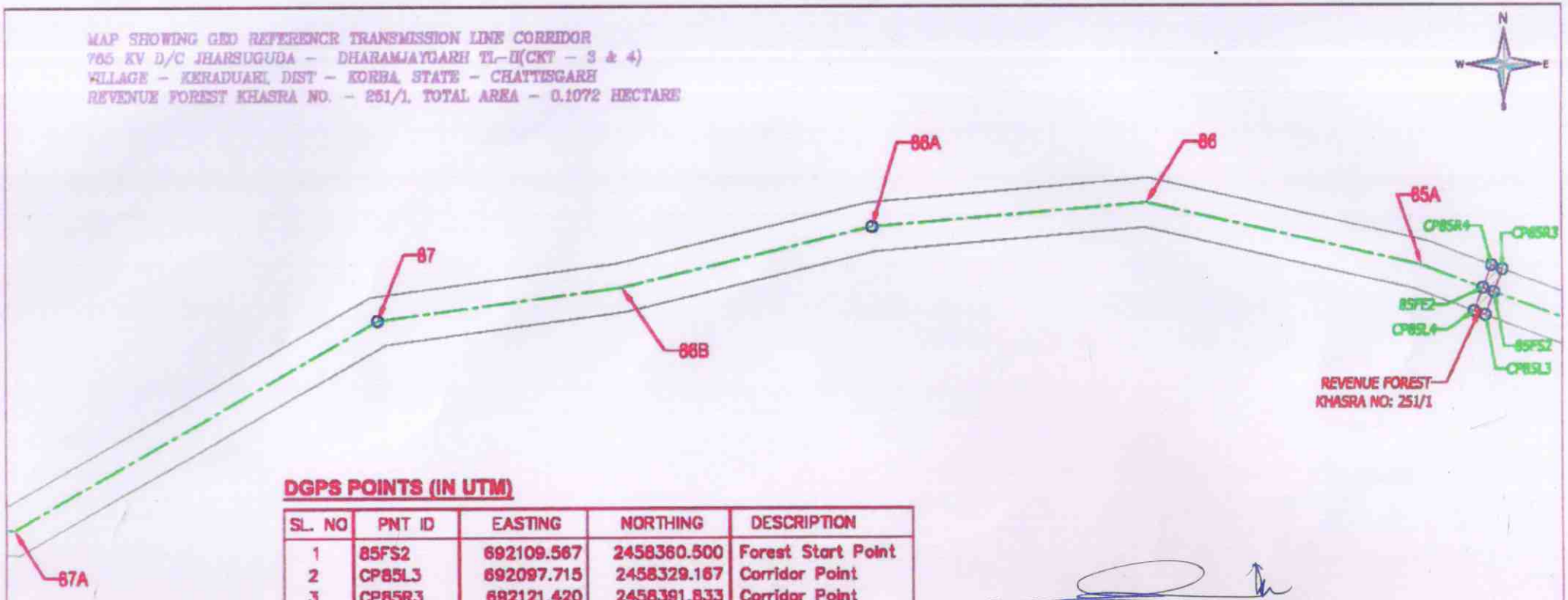
Contractor:

BAJAJ ELECTRICALS LIMITED
Rustomjee Aspiree, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East)- Mumbai -400 022 (INDIA)
Mob : +91 8879656978 / 9560686978 ; Tel : 022-24064000

Client:

POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCR TRANSMISSION LINE CORRIDOR
765 KV D/C JHARSUGUDA – DHARAMJAYGARH TL-II(CKT – 3 & 4)
VILLAGE – KERADUARI, DIST – KORBA, STATE – CHATTISGARH
REVENUE FOREST KHASRA NO. – 251/1, TOTAL AREA – 0.1072 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	85FS2	692109.567	2458360.500	Forest Start Point
2	CP85L3	692097.715	2458329.167	Corridor Point
3	CP85R3	692121.420	2458391.833	Corridor Point
4	CP85L4	692082.607	2458334.882	Corridor Point
5	CP85R4	692108.312	2458397.548	Corridor Point
6	85FE2	692094.460	2458366.215	Forest End Point

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सहा. महाप्रबंधक (उ.के.–टी.एल.सी.)/
ASSTT. G. M. (S.S. & TLC)
पॉवर ग्रिड, कोरबा/POWER GRID, KORBA

Sheet 8 of 9

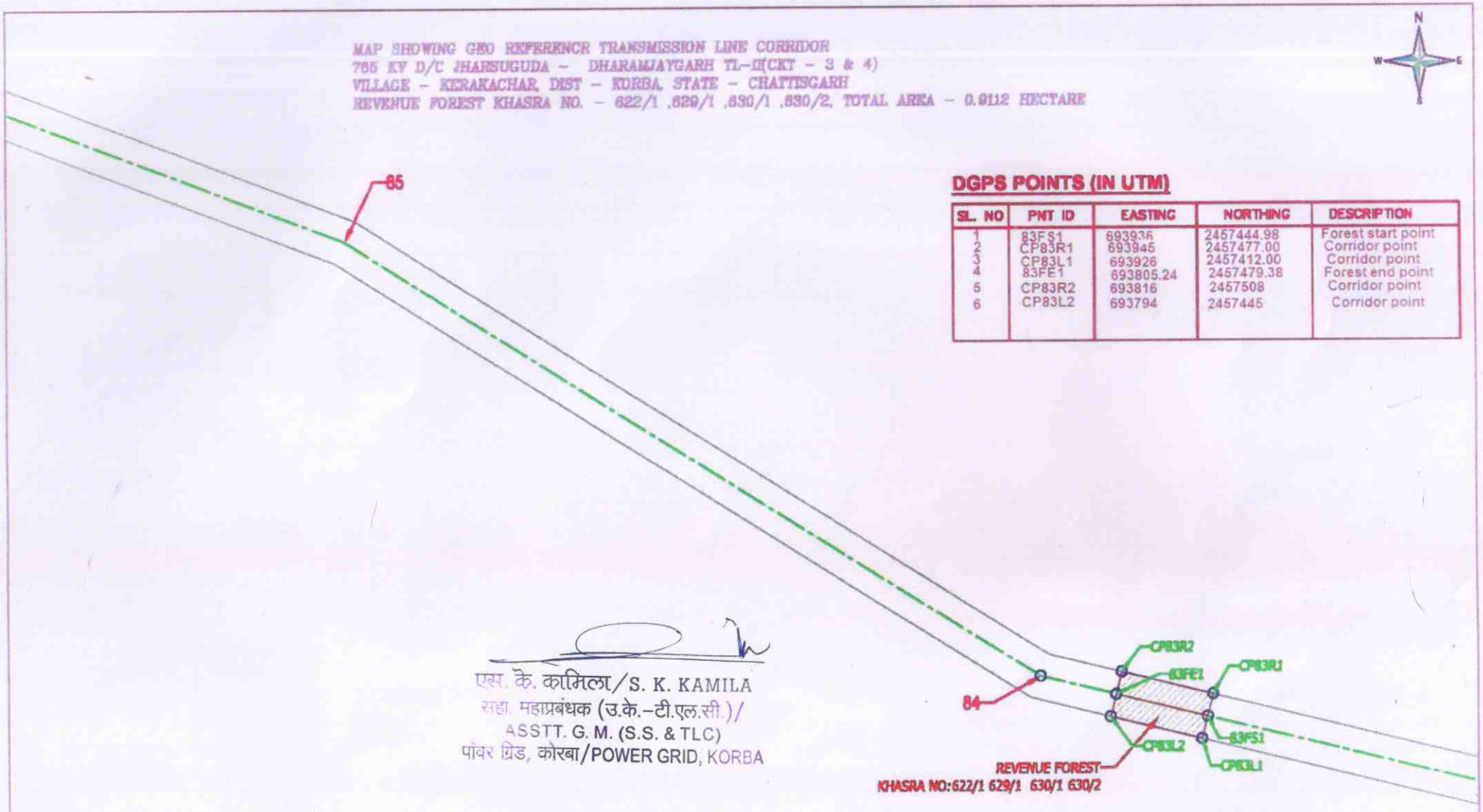
Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)
750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor:
BAJAJ ELECTRICALS LIMITED
Rustomjee Aspire, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East) Mumbai -400 022 (INDIA)
Mob : +91 8879656978 / 9560686978 : Tel : 022-24064000

Client:
POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCR TRANSMISSION LINE CORRIDOR
765 KV D/C JHARSUGUDA – DHARAMJAYGARH TL-II(CKT – 3 & 4)
VILLAGE – KERAKACHAR, DIST – KORBA, STATE – CHATTISGARH
REVENUE FOREST KHASRA NO. – 622/1 ,629/1 ,630/1 ,630/2, TOTAL AREA – 0.9112 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	83FS1	693936	2457444.98	Forest start point
2	CP83R1	693945	2457477.00	Corridor point
3	CP83L1	693926	2457412.00	Corridor point
4	83FE1	693805.24	2457479.38	Forest end point
5	CP83R2	693816	2457508	Corridor point
6	CP83L2	693794	2457445	Corridor point

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पॉवर ग्रिड, कोरबा/POWER GRID, KORBA

Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)

750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor:

BAJAJ ELECTRICALS LIMITED
Rustomjee Aspire, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East), Mumbai-400 022 (INDIA)
Mob : +91 8879686978 / 9860686978 : Tel : 022-24064000

Client:

POWER GRID CORPORATION OF INDIA LIMITED
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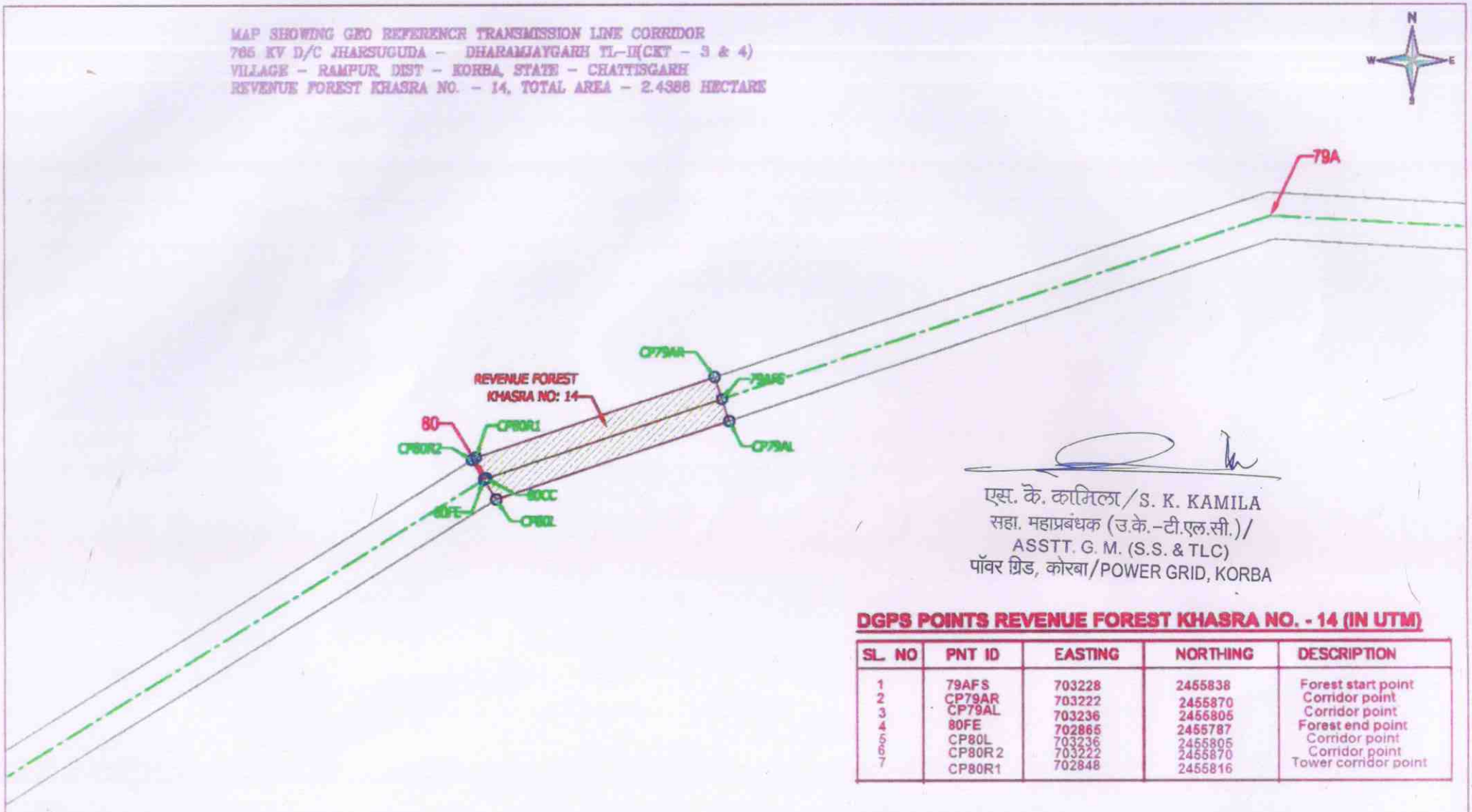
MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765 KV D/C JHARSUGUDA – DHARAMJAYGARH TL–II(CKT – 3 & 4)
VILLAGE – RAMPUR, DIST – KORBA, STATE – CHATTISGARH
REVENUE FOREST KHASRA NO. – 14, TOTAL AREA – 2.4388 HECTARE



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सहा. महाप्रबंधक (उ.के.–टी.एल.सी.)/
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DGPS POINTS REVENUE FOREST KHASRA NO. - 14 (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	79AFS	703228	2455838	Forest start point
2	CP79AR	703222	2455870	Corridor point
3	CP79AL	703236	2455805	Corridor point
4	80FE	702865	2455787	Forest end point
5	CP80L	703236	2455805	Corridor point
6	CP80R2	703222	2455870	Corridor point
7	CP80R1	702848	2455816	Tower corridor point

Sheet 6 of 9

Activity	Name	Designation	Signature	Date
Prepared				
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Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)

750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor:

BAJAJ ELECTRICALS LIMITED
Rustomjee Aspree, Bhanu Shankar Yagnik Marg
Off Eastern Express Highway, Sion (East), Mumbai – 400 022 (INDIA)
Mob : +91 8879656978 / 9560686978 ; Tel : 022-2406 4000

Client:

POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765 KV D/C JHARSUGUDA – DHARAMJAYGARH TL-II(CKT – 3 & 4)
VILLAGE – RAMPUR, DIST – KORBA, STATE – CHATTISGARH
REVENUE FOREST KHASRA NO. – 125/1, TOTAL AREA – 0.5620 HECTARE

DGPS POINTS REVENUE FOREST KHASRA NO. - 125/1 (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	79AFS	704239.00	2455976.00	Forest start point
2	CP79AR	704229.00	2456008.00	Corridor point
3	CP79AL	704164.00	2455932.00	Corridor point
4	80CC	704155.00	2455965.00	Forest end point
5	CP80R1	704229.00	2456008.00	Corridor point
6	CP80L	704146.00	2455998.00	Corridor point

एस. के. कामिला/S. K. KAMILA
सहा. महाप्रबंधक (उ.के.-टी.एल.सी.)/
ASSTT. G. M. (S.S. & TLC)
पॉवर ग्रिड, कोरबा/POWER GRID, KORBA

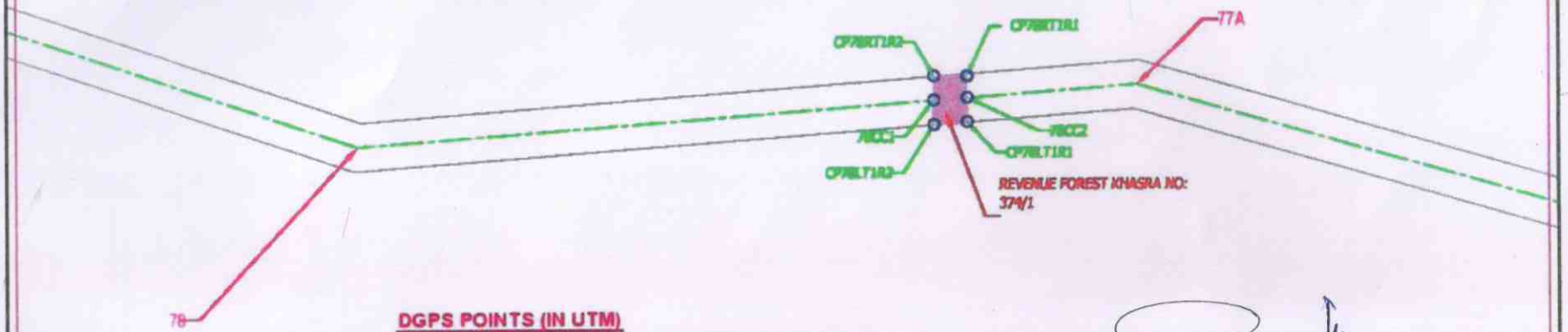
Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale:– 1:7,500 (1cm = 75m)
750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor:
BAJAJ ELECTRICALS LIMITED
Bastoujee Aspire, Bhanu Shankar Yagnik Marg
Mob : +91 8879656978 / 9560686978 : Tel : 022-24064000

Client:
POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765 KV D/C JHARSUGUDA – DHARAMJAYGARH TL-II(CKT – 3 & 4)
VILLAGE – HARKONHA, DIST – KORBA, STATE – CHATTISGARH
REVENUE FOREST KHASRA NO. – 374/1, TOTAL AREA – 1.3085 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	78CC2	709681.00	2454918.00	Forest Start Point
2	CP78RT1R1	709641.00	2454959.00	Corridor point
3	CP78LT1L1	709633.00	2454894.00	Corridor point
4	78CC1	709636.00	2454924.00	Forest end point
5	CP78RT1R2	708672.00	2455082.00	Corridor point
6	CP78TR1L2	709672.00	2454888.00	Corridor point

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सहा. महाप्रबंधक (उ.के.–टी.एल.सी.)/
ASSTT. G. M. (S.S. & TLC)
पॉवर ग्रिड, कोरबा/POWER GRID, KORBA

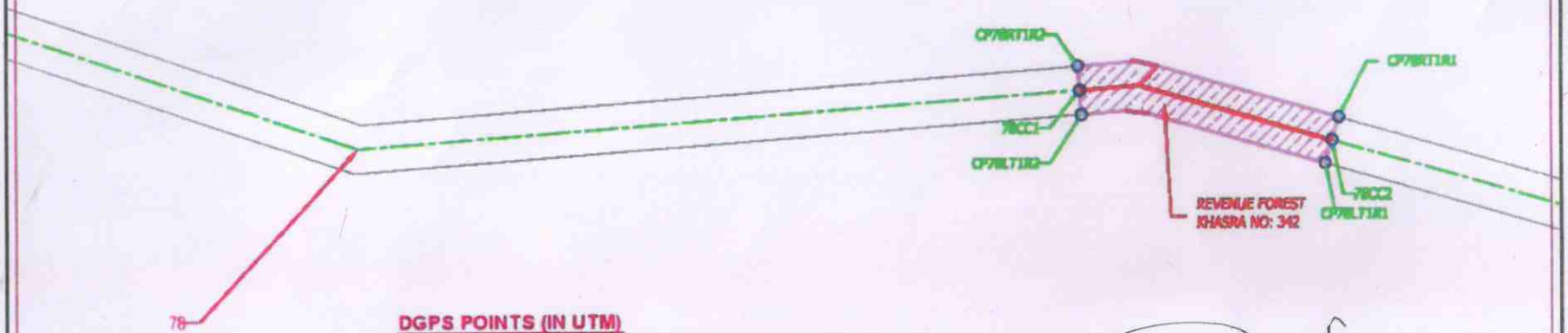
Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)
750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor: BAJAJ ELECTRICALS LIMITED
Rustomjee Aspire, Bhanu Shankar Yagnik Marg
Mob. : +91 8879056978 / 9560688978 ; Tel : 022-24064000

Client: POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765 KV D/C JHARSUGUDA – DHARAMJAYGARH TL-II(CKT – 3 & 4)
VILLAGE – HARKONHA, DIST – KORBA, STATE – CHATTISGARH
REVENUE FOREST KHASRA NO. – 342, TOTAL AREA – 2.3686 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	78CC2	709028.00	2455000.00	Forest start point
2	CP78RT1R1	708677.00	2455078.00	Corridor point
3	CP78LT1R1	708670.00	2455013.00	Corridor point
4	78CC1	708673.00	2455047.00	Forest end point
5	CP78RT1R2	709036.00	2455031.00	Corridor point
6	CP78LT1R2	709020.00	2454965.00	Corridor point

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सहा. महाप्रबंधक (उ.के.-टी.एल.सी.)/
ASSTT. G. M. (S.S. & TLC)
पॉवर ग्रिड, कोरबा/POWER GRID, KORBA

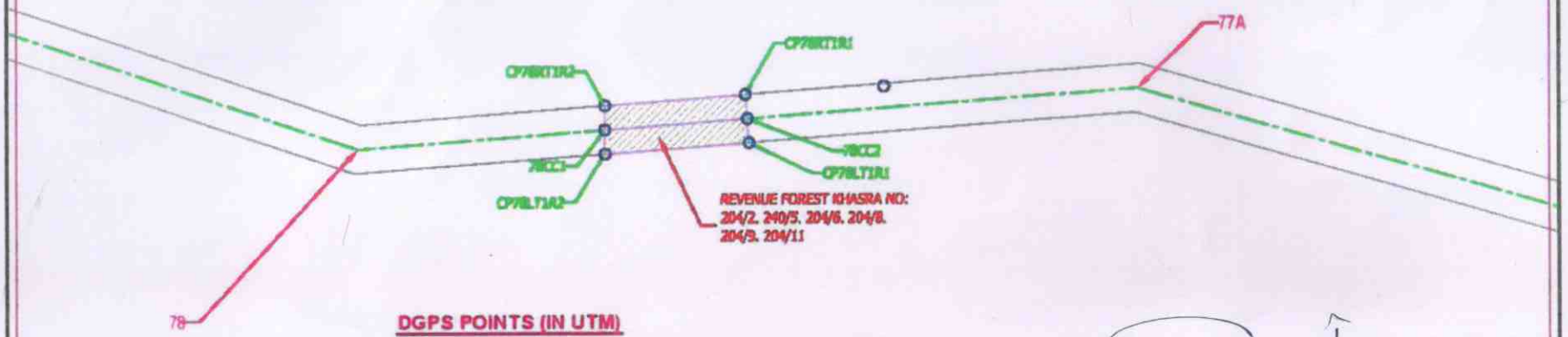
Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)
750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor:
BAJAJ ELECTRICALS LIMITED
Bachhraj Bajaj, Bhanu Shankar Yagnik Marg
Mob. : +91 8879656978 / 9560688978 ; Tel : 022-24064000

Client:
POWER GRID CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

MAP SHOWING GEO REFERENCE TRANSMISSION LINE CORRIDOR
765 KV D/C JHARSUGUDA – DHARAMJAYGARH TL-II(CKT – 3 & 4)
VILLAGE – PATRAPALI, DIST – KORBA, STATE – CHATTISGARH
REVENUE FOREST KHASRA NO. – 204/2, 240/5, 204/6, 204/8,
204/9, 204/11, TOTAL AREA – 1.3065 HECTARE



DGPS POINTS (IN UTM)

SL. NO	PNT ID	EASTING	NORTHING	DESCRIPTION
1	78CC2	708670.00	2455047.00	Forest start point
2	78CC1	708477.00	2455072.00	Forest end point
3	CP78RT1R1	708476.00	2455105.00	Corridor point
4	CP78LT1R1	704878.22	2455037.99	Corridor point
5	CP78RT1R2	708672.00	2455082.00	Corridor point
6	CP78LT1R2	708672.00	2455015.00	Corridor point

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सहा. महाप्रबंधक (उ.के.–टी.एल.सी.)/
ASSTT. G. M. (S.S. & TLC)
पॉवर ग्रिड, कोरबा/POWER GRID, KORBA

Activity	Name	Designation	Signature	Date
Prepared				
Processed				
Checked				
Approved				

Scale: – 1:7,500 (1cm = 75m)
750m 675 600 525 450 375 300 225 150 75 0 75 150m

Contractor: BAJAJ ELECTRICALS LIMITED
Bajaj Bhawan, Jamnalal Bajaj Marg, Nariman Point, Mumbai 400 021
Mob : +91 8879656978 / 9860688978 : Tel : 022 24064000

Client: POWER GRID CORPORATION OF INDIA LIMITED
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