Preparation of the Geo-referenced map through DGPS Survey of Revenue Forest land in Bilaspur Forest Division over an area of 4.33Ha. for Jharsuguda (Sundargarh) –Raipur Pool 765 kV D/C Transmission Line of Odisha Generation Phase-II Transmission Limited (OGPTL), Chhattisgarh

Consultant

SPARC Pvt. Ltd., Bhubaneswar

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August, 2016

Prepared for:

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1. INTRODUCTION AND BACKGROUND INFORMATION

The Government of India, Central Electricity Authority vide Gazette Notification dated February 06, 2015 has notified PFC Consulting Limited to be the Bid Process Coordinator (BPC) for the purpose of selection of Bidder as Transmission Service Provider (TSP) to establish transmission system for "Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha" through tariff based competitive bidding process

Sterlite Grid 3 Limited had been participated in the international competitive bidding process for Transmission Scheme for "Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha ".

Power Finance Corporation Consulting Limited (PFCCL), Government of India has accepted our Bid and SGL 3 has been declared as the successful bidder.

Special Purpose Vehicle (SPV) constructed for this project is "Odisha Generation Phase II Transmission Ltd". SPV acquisition process is under progress.

Prior approval under Section 68(1) of Electricity Act, 2003 from Ministry of Power, Government of India has been already taken for construction of transmission element by "Odisha Generation Phase II Transmission Ltd" (Associated Transmission Lines are 765kV D/C Raipur-Jharsuguda & 400kV D/C OPGC-Jharsuguda) vide letter no. 68/ER/2015/1301 dated 3rd June 2015.

The details of lines is mentioned here under: -

1. 765kV D/C Raipur-Jharsuguda Transmission Line: 300 K.M (Approx.)

Above said line passes through Durg, Bematara, Baloda Bazar, Bilaspur, Janjgir Champa & Raigarh districts of Chattisgarh State (Total Line length is 255 K.M Approx) and Jharsuguda district of Odisha State (Total Line length is 45 K.M Approx).

As per directives of Ministry of Environment & Forests dated 8th July 2011; all applications seeking diversion of forest land for non-forest purpose under Forest Conservation Act, 1980 must be accompanied with Geo-referenced shapefile (both soft copy and hard copy) of the forest land proposed for diversion prepared using Differential GPS (DGPS)

As per Online Submission and Monitoring of Forests Clearances Proposals of MoEF & CC, the following maps and files are required to be uploaded

In order to comply with the conditions of DGPS survey guideline for PCCF given to SPGVL is enclosed at *Annexure-1.* To meet these requirements, SPGVL is entrusted this DGPS survey work to M/s SPARC Pvt. Ltd., Bhubaneswar, a Government recognized reputed firm specializing in such assignments. Credential of SPARC is enclosed at Appendix-1

2. SCOPE

The envisaged scopes of the assignments are described below

- Computation of Geo-referenced forest land through digitization and comparison with area indicated in the land schedule.
    - Establishment of Base Station by taking DGPS long Observation and fixing the coordinate by processing with IGS (International GNSS Services) data.
    - DGPS observation at the change point of the forest land
- Processing of DGPS observation and geo-referencing of the Forest land based on DGPS Surveyed co-ordinates.
- Generation of the *shape* file and *kml* file of the Forest land
- Printing of Hard copy maps and report.

3. DELIVERABLE

- Post processed DGPS observations data as well as raw data in RINEX format.
- Geo-referenced scanned cadastral/forest compartment maps based on field observation.
- Geo-referenced shape, kml file (soft copy) of the Forest land with area statement.
- Submission of maps & report in 10 nos. hard copy along with soft copy and shape/kml file as per requirement of MoEF guidelines.

4. METHODOLOGY

4.1 INPUT DATA

The land plan and maps required for geo-referencing was provided by SPGVL to M/s SPARC along with the land schedules for desk study. The following maps are used for the desk study.

- Revenue maps of the Forest land Map
- Survey of India Topo Sheets
- Land Schedule *(Table-1)*

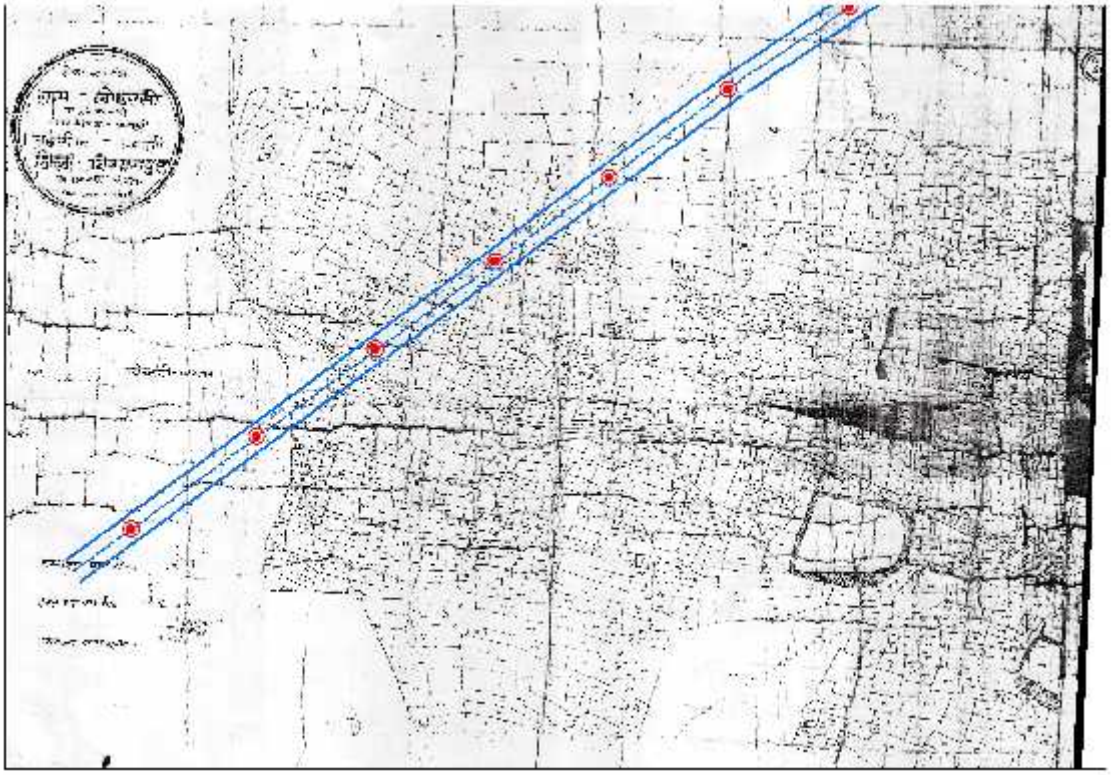


Fig-1: Transmission Line Superimposed on Cadastral Map (Loharsi-2)

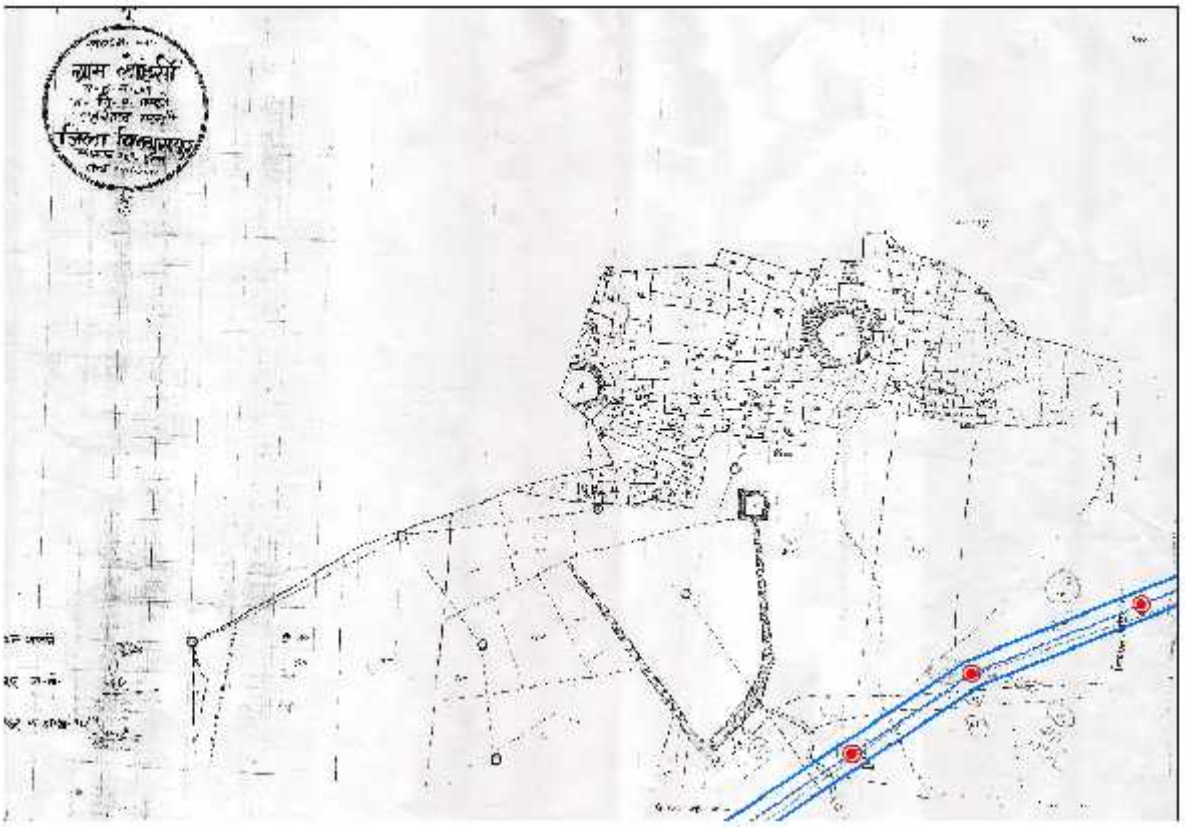


Fig-2: Transmission Line Superimposed on Cadastral Map (Loharsi-1)

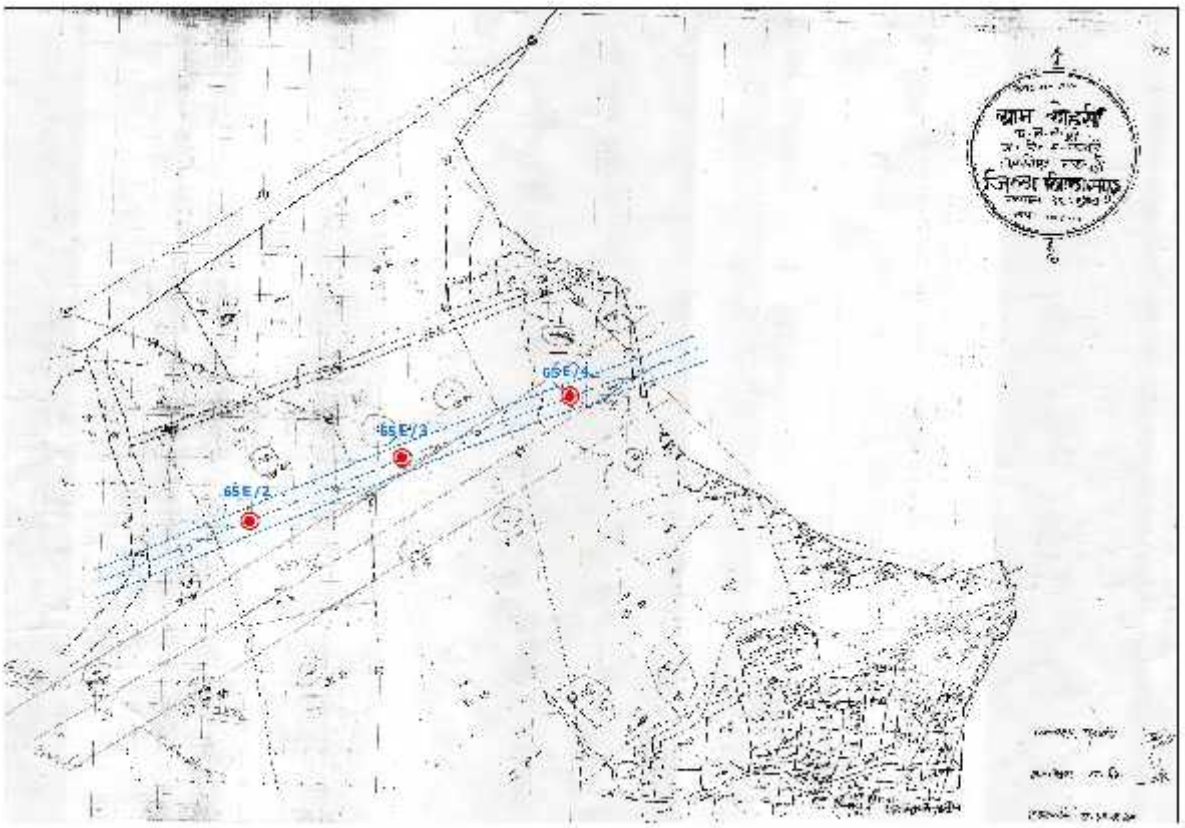
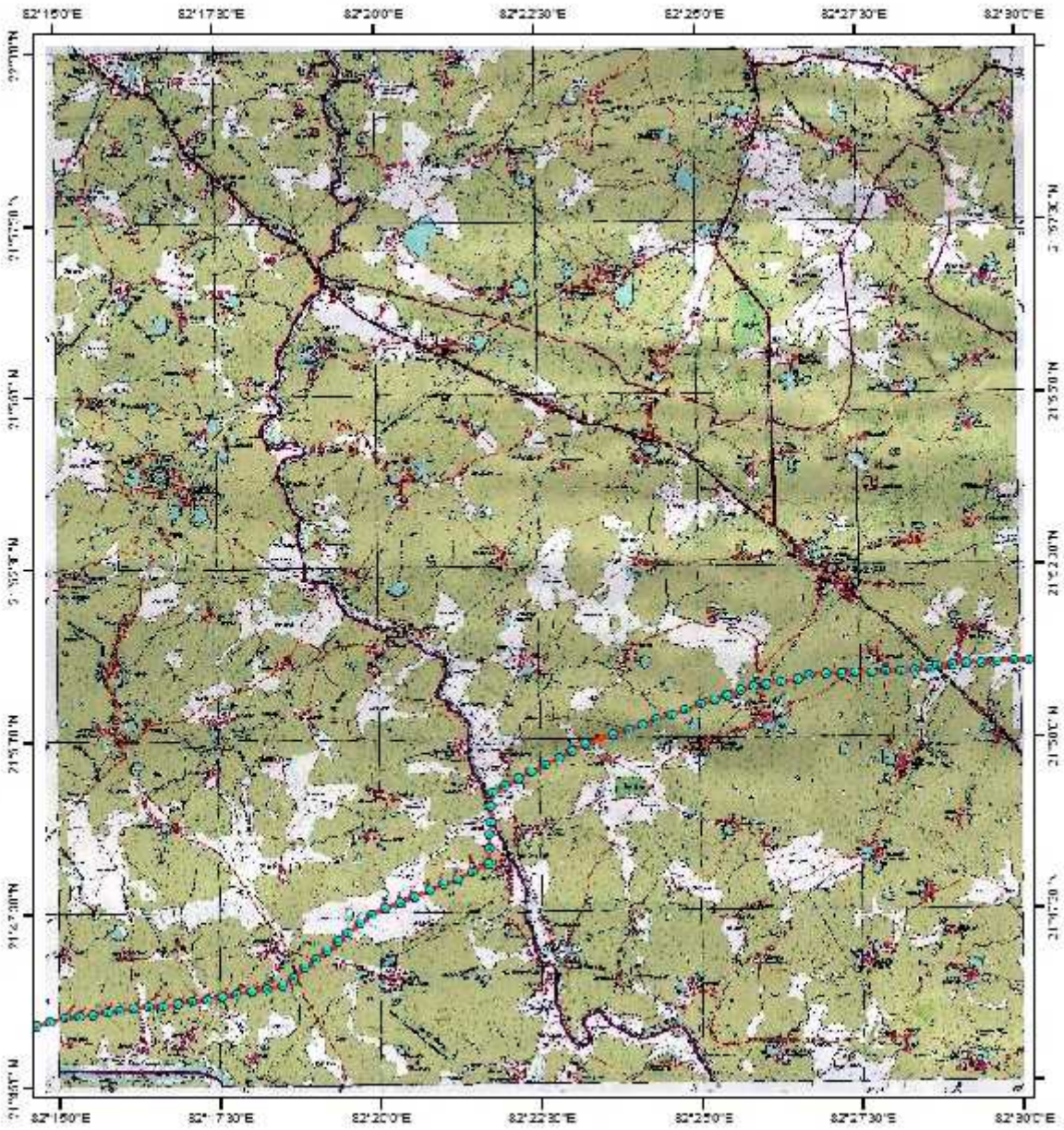


Fig-3: Transmission Line Superimposed on Cadastral Map (Loharsi-5)

Fig-4: Transmission Line Superimposed on Topo Sheet



4.2 PRINCIPLE OF DGPS SURVEY

DGPS Survey is carried out by a pair of devices, one is called base and other is called as rover in order to eliminate the un-avoidable error which may occur during survey as transmission delays in the ionosphere, multipath signal due to foreign object which may induce in the DGPS observation.

Base is stationary and fixed in an ideal location (that has a clear line of sight to the sky in all directions away from vertical obstructions such as buildings, deep cuttings, site vehicles, towers, or tree canopy) which is act as the Primary Control Point (PCP) while the rover collects the reading at target locations.

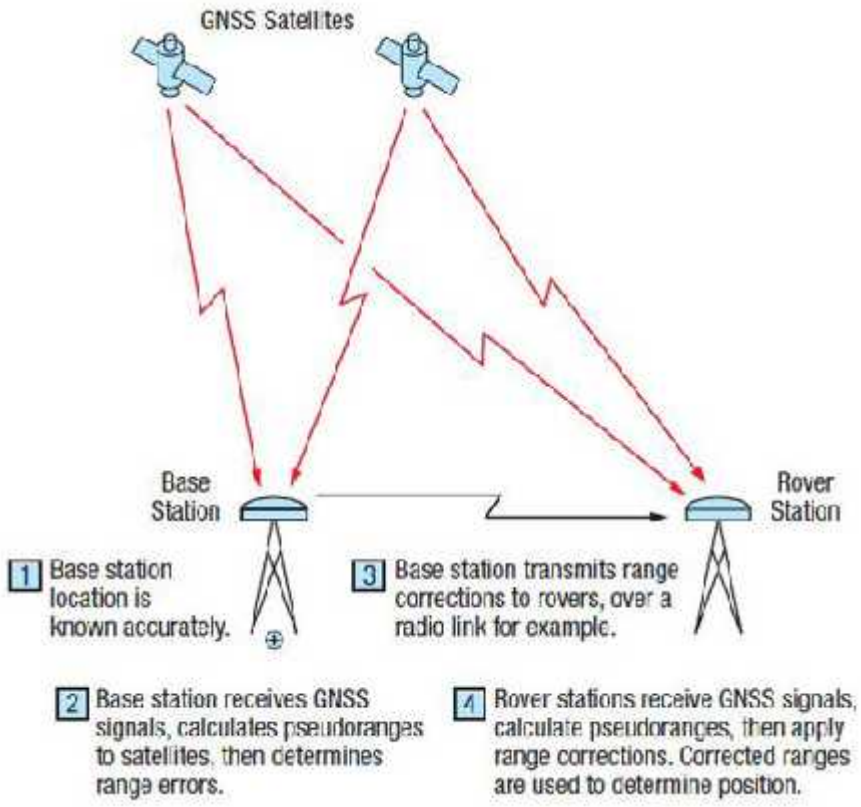


Fig-3: Concept of the DGPS survey

As the rover has no choice of sites and has to take reading at the pre fixed target location, it may induce error as discussed earlier. Therefore, the data received by the rover has to be processed with the observation received by the base rover in real time mode (through radio link) or during post process in a later stage to eliminate the error and get the final reading (coordinate value).

4.3 ESTABLISHMENT OF BASE STATION/PRIMARY CONTROL POINT (PCP)

The PCP was so planned to keep the entire project area within 3.0-4.0 Km from PCP for DGPS Survey.

GPS satellites complete one cycle of rotation around the earth in approximately 6 hours. Base Station was fixed through continuous observation of 12 hours (so that the base receives signals of all the satellite at least once) at the PCP on 19th July 2016 and further processing with the observed data of International GNSS Stations (IGS). The IGS processed report is enclosed at *Annexure-2.* The processed coordinate value is as follows.

Table-2: Coordinate of Base Station

Location	Latitude	Longitude	Northing (m)	Easting (m)
Bilaspur	21°47'08.98262" N	82°18'36.53707" E	2409696.289	635445.435

As per the National Map policy, all the maps are prepared with UTM Projection using the Datum WGS-1984 to seamless integration with new Open Series Maps (OSM) Topo Sheets published by Survey of India.

4.4 SECONDARY CONTROL POINT (SCP) SURVEY

4-6 secondary point per revenue sheet are required to geo-reference the maps based on DGPS survey. The Secondary Control Points (SCPs) in the area of interest were planned at convenient location. SCPs are planned well distributing in the revenue maps covering Tri-junction, Bi-junction, undistributed field bund.

DGPS observations were taken SCPs location (for 15 minutes each) using rover. The data observed by base and rover were post processed using advanced Trimble Business Centre software for obtaining the final SCP Co-ordinates. The SCPs with fixed solutions only were used for Geo-referencing of the revenue maps.

4.5 PREPARATION OF GEO-REFERENCING OF REVENUE FOREST LAND

With geo-referencing of cadastral maps, each and every parcel of the revenue map also automatically geo-referenced. The forest patches were extracted from geo-referenced cadastral map as per land schedule provided by SPGVL to prepare the geo-referenced forest land map.

DGPS observations were taken at all change point of the Forest boundary using Trimble R-6 Dual frequency (with Glonass) DGPS. The data observed by base and rover were post processed using advanced Trimble Business Centre software for obtaining the final change point Co-ordinates. These co-ordinates were plotted in GIS software to prepare the geo-reference forest land map. 41 nos of change points are taken on both site of the forest boundary.

5. CONCLUSION

The observed DGPS co-ordinates of SCPs of Cadastral Map, forest boundary pillars and area are given in *Table-3 and Table-5* respectively.

Table-3: Coordinates of Change point of Forest Land

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Easting	Northing	Longitude	Latitude
Village Name-Loharsi				
1	637892.770	2411143.527	82°20'2.17730"	21°47'55.36003"

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Easting	Northing	Longitude	Latitude
2	639011.739	2411855.527	82°20'41.35388"	21°48'18.19567"
3	639280.254	2411095.248	82°20'50.47224"	21°47'53.3981"
4	639642.843	2410334.129	82°21'2.86483"	21°47'28.54630"
5	638105.118	2410004.311	82°20'9.22748"	21°47'18.25711"
6	636838.370	2411029.284	82°19'25.43073"	21°47'51.94058"
7	637765.403	2411023.660	82°19'57.70656"	21°47'51.49817"
8	636414.944	2410031.831	82°19'10.39077"	21°47'19.62478"
9	635667.604	2410287.488	82°18'44.447"	21°47'28.14509"
10	637694.746	2409984.530	82°19'54.93409"	21°47'17.72924"
11	635737.314	2409715.308	82°18'46.70458"	21°47'9.52042"
12	637833.182	2409434.200	82°19'59.58834"	21°46'59.79559"
13	636094.192	2408711.121	82°18'58.83136"	21°46'36.76873"
14	637672.306	2408307.223	82°19'53.64916"	21°46'23.1954"
Village Name-Bohardih				
16	640100.772	2412273.141	82°21'19.40135"	21°48'31.46485"
17	640734.088	2412120.193	82°21'41.40657"	21°48'26.31017"
18	641048.116	2411122.788	82°21'52.33759"	21°47'53.78835"
19	639738.619	2411160.833	82°21'6.45157"	21°47'55.40028"
20	640817.444	2412432.337	82°21'44.40507"	21°48'36.43587"
21	639320.667	2411831.996	82°20'52.10349"	21°48'17.34286"

Table-4: Coordinates of Change point of Forest Land

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Easting	Northing	Longitude	Latitude
Patch-1 (Loharsi)				
1	636975.561	2409818.491	82°19'29.84547"	21°47'12.53151"
2	636895.522	2409754.103	82°19'27.39637"	21°47'10.46017"
3	636859.606	2409754.684	82°19'25.78936"	21°47'10.48906"
4	636858.974	2409724.702	82°19'25.75842"	21°47'9.51433"
5	636720.547	2409613.343	82°19'20.90580"	21°47'5.93191"
6	636708.594	2409617.192	82°19'20.49081"	21°47'6.60378"
7	636707.709	2409688.710	82°19'20.48133"	21°47'8.38617"
8	636958.307	2409890.065	82°19'29.26616"	21°47'14.86364"
9	636975.027	2409902.184	82°19'29.85187"	21°47'15.25305"
10	636978.143	2409883.138	82°19'29.95466"	21°47'14.63288"
Patch-2				
17	637494.612	2410196.280	82°19'48.29828"	21°47'24.67071"
18	637390.841	2410121.060	82°19'44.39434"	21°47'22.25389"
19	637379.884	2410145.157	82°19'44.20087"	21°47'23.40504"
20	637357.230	2410179.228	82°19'43.24157"	21°47'24.15472"
21	637363.818	2410184.003	82°19'43.47236"	21°47'24.30815"
22	637381.494	2410188.695	82°19'44.892"	21°47'24.45575"

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Easting	Northing	Longitude	Latitude
23	637438.648	2410194.482	82°19'46.80832"	21°47'24.62793"
Patch-3				
11	637425.236	2410228.524	82°19'45.62409"	21°47'25.73859"
12	637543.956	2410314.580	82°19'49.78332"	21°47'28.50356"
13	637648.805	2410362.195	82°19'53.44808"	21°47'30.22448"
14	637653.046	2410290.724	82°19'53.57428"	21°47'27.69725"
15	637577.719	2410256.521	82°19'50.94137"	21°47'26.60623"
16	637563.422	2410246.158	82°19'50.44051"	21°47'26.27328"
Patch-4				
24	638420.107	2410712.474	82°20'20.40797"	21°47'41.19522"
25	638517.117	2410756.531	82°20'23.79892"	21°47'42.60038"
26	638525.392	2410725.424	82°20'24.77614"	21°47'41.58659"
Patch-5 (Bohardih)				
27	640618.007	2411659.967	82°21'37.22330"	21°48'11.37876"
28	640610.318	2411641.594	82°21'36.94992"	21°48'10.78357"
29	640623.620	2411642.113	82°21'37.41323"	21°48'10.79661"
30	640646.133	2411635.853	82°21'38.19521"	21°48'10.58661"
31	640658.187	2411626.270	82°21'38.61196"	21°48'10.27155"
32	640636.470	2411621.126	82°21'37.85423"	21°48'10.11053"
33	640564.628	2411623.054	82°21'35.35336"	21°48'10.19380"
34	640544.561	2411619.693	82°21'34.65363"	21°48'10.9028"
35	640531.260	2411621.706	82°21'34.19109"	21°48'10.15953"
Patch-6				
36	640696.994	2411678.063	82°21'39.97909"	21°48'11.94450"
37	640673.360	2411678.001	82°21'39.15617"	21°48'11.94928"
38	640663.467	2411680.017	82°21'38.81233"	21°48'12.17683"
39	640671.544	2411683.579	82°21'39.94631"	21°48'12.13119"
40	640671.940	2411689.133	82°21'39.11013"	21°48'12.31166"
41	640696.163	2411688.344	82°21'39.95333"	21°48'12.27906"

Table-5: Area Statement of Forest Boundary

जिला	तहसील	(ग्राम)	(खसरा नं)	डी.जी.पी.एस सर्वेक्षण पश्चात रकबा		(मद)
				कुल रकबा(हे0)	प्रभावित रकबा (हे0)	
बिलासपुर	मस्तुरी	बोहारडीह	91	11.332	0.242	बडे झाड का जंगल
		लोहर्सी	3/1	20.207	0.017	बडे झाड का जंगल
			3/1ब	1.311	0.914	बडे झाड का जंगल
			3/1प	1.211	0.472	बडे झाड का जंगल
			3/1न	1.285	0.838	बडे झाड का जंगल
			138/1	7.244	0.495	बडे झाड का जंगल
			138/3	4.047	1.184	बडे झाड का जंगल
			2839/1	8.094	0.170	बडे झाड का जंगल
		Total Area (कुल रकबा)		**54.731**	**4.330**	

The forest boundary map is placed at *Plate-1 to Plate-4*. The Geo-referenced forest boundary superimposed on SoI Topo sheet & High Resolution Satellites Image are enclosed at *Plate-5 to Plate-6* respectively.

6. SPECIFICATION OF DGPS EQUIPMENT & SOFTWARE

SPARC deployed advanced and hi-precision devices to carry out the DGPS survey. The DGPS performance specifications are given below. The corresponding fact sheets are placed at *Annexure-2* for ready reference.

FOREST BOUNDARY SUPERIMPOSED ON HIGH RESOLUTION SATELLITE IMAGE OF 765KV D/C JHARSUGUDA (SUNDARGARH-RAIPUR) TRANSMISSION LINE OF ODISHA GENERATION PHASE-II TRANSMISSION LIMITED (OGPTL),BILASPUR FOREST DIVISION, DISTRICT-BILASPUR, CHHATISGARH

ODISHA GENERATION PHASE II TRANSMISSION LIMITED

N
W E
S

0 0.1 0.2 0.4 0.6 0.8 1 KM

SCALE:10,000

65F/0
65E/5
65E/4
65E/3
65E/2
65E/1
65E/0
65D/7
65D/6
65D/5
Patch-1
Patch-2
Patch-3
Patch-4
Patch-5/6

Image © 2016 CNES / Astrium

Google earth

Legend

- Forest Pillar
- AP
- Center line
- Transmission Line
- Forest Boundary

Odisha Generation Phase II Transmission Ltd.
Rishant Acharya
Dy. Manager PKG-2 (Projects)

Map Showing DGPS Surveyed Co-ordinates and Boundary of Forest Area Proposed to be Diverted for 765KV D/C line from Raipur to Jharsuguda (Sundargarh) Transmission Line in Village-Loharsi S2, Tahasil-Masturi,Bilaspur Forest Division, District-Bilaspur,Chhatisgarh

Scale:- 1:3,960

0 50 100 150 200 250 500 m

LEGEND

- Observation Point
- AP Point
- Forest Plot
- Patch Boundary
- Forest Pillar
- Centre Line
- Alignment Boundary

CO-ORDINATES OF SCP/DGPS OBSERVATION POINT

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Eastng	Northing	Longitude	Lattude
11	635737.314	2409715.308	82°18'46.70458"	21°47'9.52042"
12	637833.182	2409434.200	82°19'59.58834"	21°46'59.79559"
13	636094.192	2408711.121	82°18'58.83136"	21°46'36.76873"
14	637672.306	2408307.223	82°19'53.64916"	21°46'23.1954"

CO-ORDINATES OF FOREST PILLAR

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Eastng	Northing	Longitude	Lattude
Patch-1				
F1	636978.853	2409820.871	82°19'29.960802"	21°47'12.607957"
F2	636893.101	2409751.952	82°19'26.954692"	21°47'10.390884"
F3	636863.223	2409750.265	82°19'25.913992"	21°47'10.344374"
F4	636863.068	2409727.814	82°19'25.901868"	21°47'9.614394"
F5	636720.385	2409613.373	82°19'20.900178"	21°47'5.932935"
F6	636713.521	2409693.385	82°19'20.685069"	21°47'8.536545"
F7	636958.307	2409890.064	82°19'29.266162"	21°47'14.86364"
F8	636975.027	2409902.184	82°19'29.851871"	21°47'15.253043"
F9	636978.143	2409883.138	82°19'29.954663"	21°47'14.632875"
F10	636981.683	2409839.169	82°19'30.64787"	21°47'13.202166"

Area Statement:-

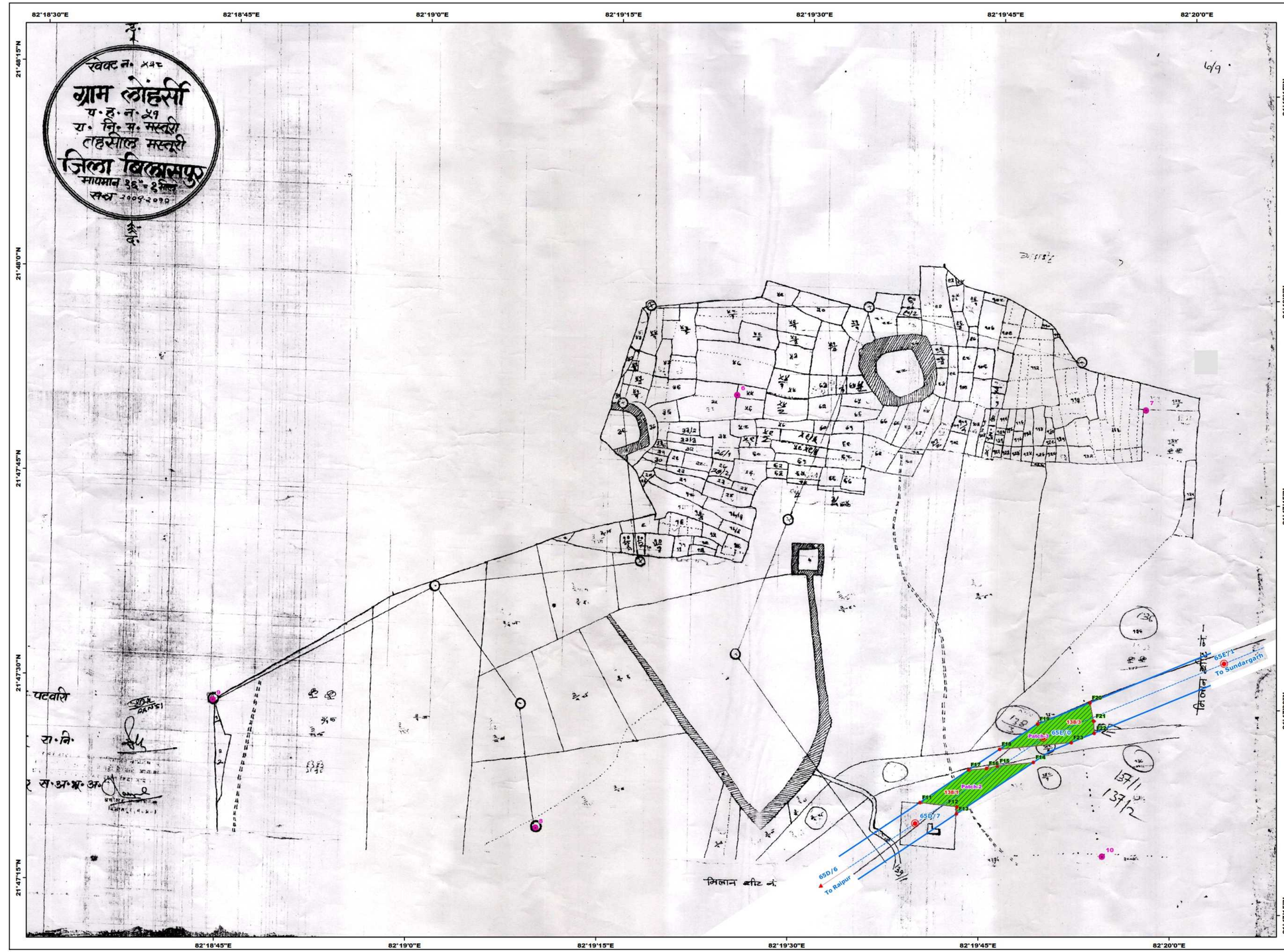
Village Name	Khasra No	Patch	Total Area (Hactare)	DGPS Area (Hactare)	Type of Land
Loharsi S2	3/1	Patch-1	20.207	0.017	Bade jhar ki Jungle
	3/1 ब		1.311	0.914	Bade jhar ki Jungle
	3/1 प		1.211	0.472	Bade jhar ki Jungle
	3/1 न		1.285	0.838	Bade jhar ki Jungle
Total Area			**24.014**	**2.241**	

Spatial Pla... ...nalysis Research Centre Pvt. Ltd.
E/11, I... ...tan... ...ri's Estate
Chandrase... ...ur, Bhubans... ...-751024 (INDIA)
Ph.: 0674-6623 301, 302, 303, Fax: 0674-6629 304

DGPS Survey Conducted and Map Prepared by :-
Spatial Planning And Analysis Research Centre Pvt, Ltd.,
E/11,Infocity, Chandaka Industrial Estate,
Bhubaneswar - 751024.

Plate-2

Map Showing DGPS Surveyed Co-ordinates and Boundary of Forest Area Proposed to be Diverted for 765KV D/C line from Raipur to Jharsuguda (Sundargarh) Transmission Line in Village-Loharsi S1, Tahasil-Masturi,Bilaspur Forest Division, District-Bilaspur,Chhatisgarh



Scale:- 1:3,960

0 50 100 150 200 250 500 m

LEGEND

- Observation Point
- AP Point
- Forest Plot (1945)
- Patch Boundary (Patch-1)
- Forest Pillar
- Centre Line
- Alignment Boundary

CO-ORDINATES OF SCP/DGPS OBSERVATION POINT

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Eastrg	Northing	Longitude	Lattude
6	636838.370	2411029.284	82°19'25.43073"	21°47'51.94058"
7	637765.403	2411023.660	82°19'57.70656"	21°47'51.49817"
8	636414.944	2410031.831	82°19'10.39077"	21°47'19.62478"
9	635667.604	2410287.488	82°18'44.447"	21°47'28.14509"
10	637694.746	2409984.530	82°19'54.93409"	21°47'17.72924"

CO-ORDINATES OF FOREST PILLAR

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Eastrg	Northing	Longitude	Lattude
Patch-2				
F11	637285.934	2410127.367	82°19'40.743774"	21°47'22.488329"
F12	637369.638	2410121.060	82°19'43.656129"	21°47'22.259837"
F13	637369.389	2410105.401	82°19'43.642781"	21°47'21.750729"
F14	637537.891	2410227.542	82°19'49.546019"	21°47'25.675108"
F15	637457.355	2410216.804	82°19'46.738817"	21°47'25.348511"
F16	637433.276	2410209.924	82°19'45.898405"	21°47'25.13155"
F17	637392.566	2410204.952	82°19'44.479566"	21°47'24.981276"
Patch-3				
F18	637460.620	2410254.282	82°19'46.863748"	21°47'26.566241"
F19	637543.956	2410314.580	82°19'49.783318"	21°47'28.503559"
F20	637660.181	2410367.022	82°19'53.845605"	21°47'30.176208"
F21	637670.054	2410325.734	82°19'54.176956"	21°47'28.83088"
F22	637672.718	2410299.097	82°19'54.26169"	21°47'27.964022"
F23	637621.586	2410275.766	82°19'52.474448"	21°47'27.219726"

Area Statement:-

Village Name	Khasra No	Patch	Total Area (Hactare)	DGPS Area (Hactare)	Type of Land
Loharsi S1	138/1	Patch-2	6.45	0.495	Bade jhar ki Jungle
	138/3	Patch-3	7.244	1.184	Bade jhar ki Jungle
Total Area			**13.694**	**1.679**	

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Chandrasekharpur, Bhubaneswar-751024 (INDIA)
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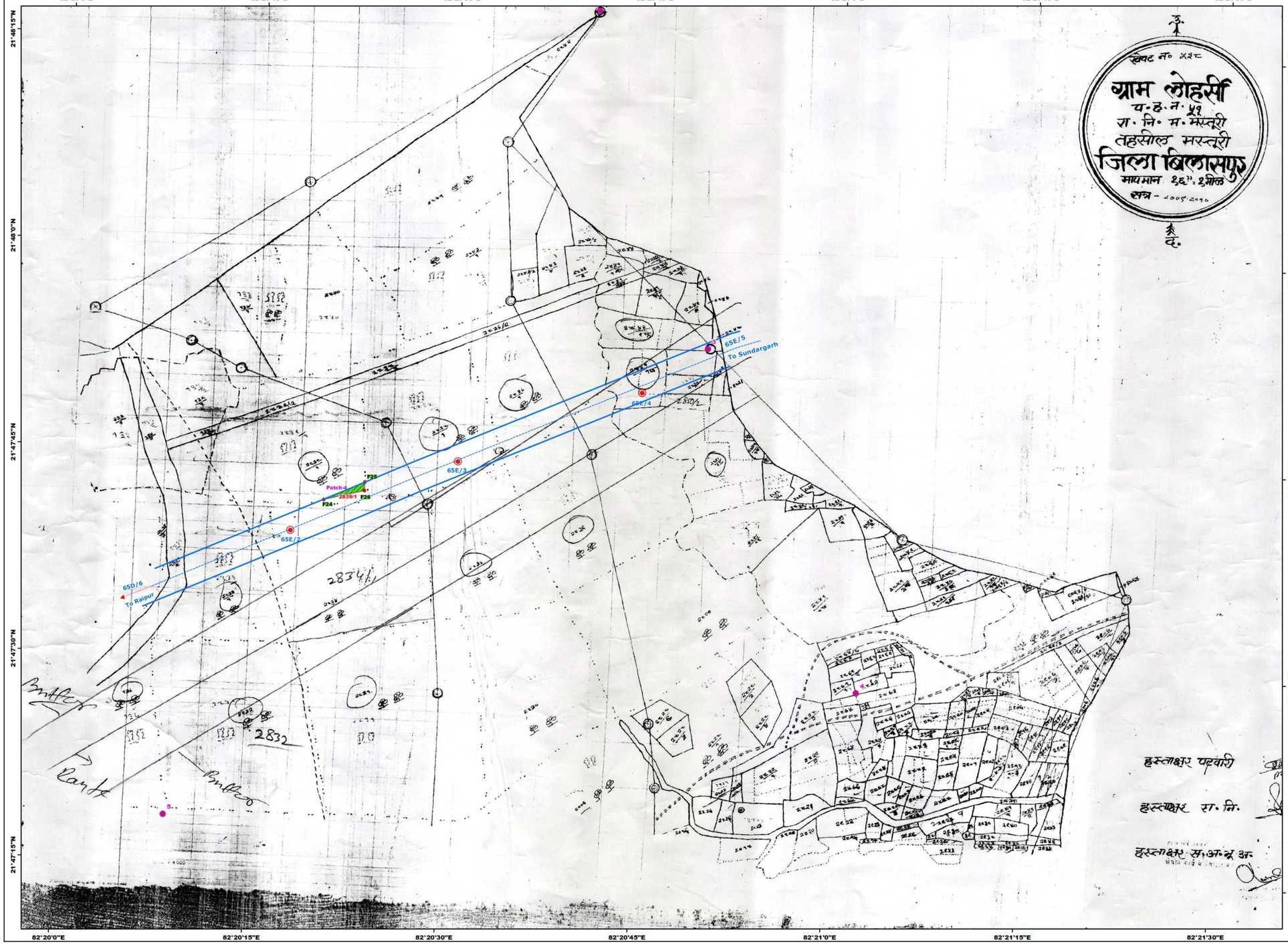
DGPS Survey Conducted and Map Prepared by :-
Spatial Planning And Analysis Research Centre Pvt, Ltd.,
E/11,Infocity, Chandaka Industrial Estate,
Bhubaneswar - 751024.

Map Showing DGPS Surveyed Co-ordinates and Boundary of Forest Area Proposed to be Diverted for 765KV D/C line from Raipur to Jharsuguda (Sundargarh) Transmission Line in Village-Loharsi S5, Tahasil-Masturi,Bilaspur Forest Division, District-Bilaspur,Chhatisgarh



Scale:- 1:3,960

0 50 100 150 200 250 500 m

LEGEND

- Observation Point
- AP Point
- Forest Plot (3935)
- Patch Boundary (Patch-1)
- Forest Pillar
- Centre Line
- Alignment Boundary

CO-ORDINATES OF SCP/DGPS OBSERVATION POINT

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Eastrg	Northing	Longitude	Lattude
11	635737.314	2409715.308	82°18'46.70458"	21°47'9.52042"
12	637833.182	2409434.200	82°19'59.58834"	21°46'59.79559"
13	636094.192	2408711.121	82°18'58.83136"	21°46'36.76873"
14	637672.306	2408307.223	82°19'53.64916"	21°46'23.1954"

CO-ORDINATES OF FOREST PILLAR

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Eastrg	Northing	Longitude	Lattude
Patch-4				
F24	638436.864	2410721.415	82°20'20.994096"	21°47'41.481198"
F25	638527.437	2410763.128	82°20'24.160208"	21°47'42.811989"
F26	638527.383	2410744.942	82°20'24.152825"	21°47'42.220681"

Area Statement:-

Village Name	Khasra No	Patch	Total Area (Hactare)	DGPS Area (Hactare)	Type of Land
Loharsi S2	2839/1	Patch-4	8.094	0.170	Bade jhar ki Jungle
Total Area			8.094	0.170	

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SHA GENERATION PHASE-II TRANSMISSION LIMITED

T: GEOINFOSYS TECHNOLOGIES

KV D/C Jharsuguda(Sundergarh) - Raipur Trasmission line

wing showing the Transmission line

Map Showing DGPS Surveyed Co-ordinates and Boundary of Forest Area Proposed to be Diverted for 765KV D/C Jharsuguda (Sundargarh-Raipur) Transmission Line of Odisha Generation Phase-II Transmission Limited (OGPTL) in Village-Bohardih, Tahasil-Masturi,Bilaspur Forest Division, District-Bilaspur,Chhatisgarh

Scale:- 1:4,000

LEGEND

Observation Point | AP Point | Forest Plot | Patch Boundary

Forest Pillar | Centre Line | Alignment Boundary

CO-ORDINATES OF SCP/DGPS OBSERVATION POINT

Pillar No	Geographic Co-ordinates		UTM Co-ordinates	
	Latitude	Longitude	Eastrg	Northing
15	N21°47'55.52913"	E82°21'06.37987"	639736.526	2411164.777
16	N21°47'53.80160"	E82°21'51.96789"	641046.220	2411123.179
17	N21°48'26.59170"	E82°21'41.71916"	640742.988	2412128.930
18	N21°48'31.53082"	E82°21'19.28324"	640097.363	2412275.140
19	N21°48'36.62151"	E82°21'44.54128"	640821.305	2412438.080
21	N21°48'17.25036"	E82°20'51.91794"	639315.363	2411829.105

CO-ORDINATES OF FOREST PILLAR

Pillar No	UTM Co-ordinates		Geographic Co-ordinates	
	Eastrg	Northing	Longitude	Latitude
Patch-5				
F27	640622.750	2411657.742	82°21'37.387741"	21°48'11.305046"
F28	640618.174	2411643.506	82°21'37.224052"	21°48'10.843485"
F29	640638.109	2411641.105	82°21'37.917427"	21°48'10.75967"
F30	640668.852	2411630.056	82°21'38.984472"	21°48'10.391605"
F31	640659.245	2411621.890	82°21'38.647451"	21°48'10.128832"
F32	640639.310	2411619.488	82°21'37.952601"	21°48'10.56453"
F33	640573.741	2411624.052	82°21'35.670959"	21°48'10.223641"
F34	640544.561	2411619.693	82°21'34.653627"	21°48'10.9028"
F35	640539.362	2411620.480	82°21'34.47285"	21°48'10.117344"
Patch-6				
F36	640702.237	2411678.573	82°21'40.161809"	21°48'11.959584"
F37	640673.360	2411678.001	82°21'39.156176"	21°48'11.949281"
F38	640669.739	2411678.739	82°21'39.30312"	21°48'11.974319"
F39	640679.486	2411683.094	82°21'39.371028"	21°48'12.113145"
F40	640679.738	2411690.582	82°21'39.382122"	21°48'12.356525"
F41	640698.154	2411690.582	82°21'40.23331"	21°48'12.351241"

Area Statement:-

Village Name	Khasra No	Patch	Total Area (Hactare)	DGPS Area (Hactare)	Type of Land
Bohardih	91	Patch-5/6	11.332	0.242	Bade jhar ki Jungle
Total Area			11.332	0.242	

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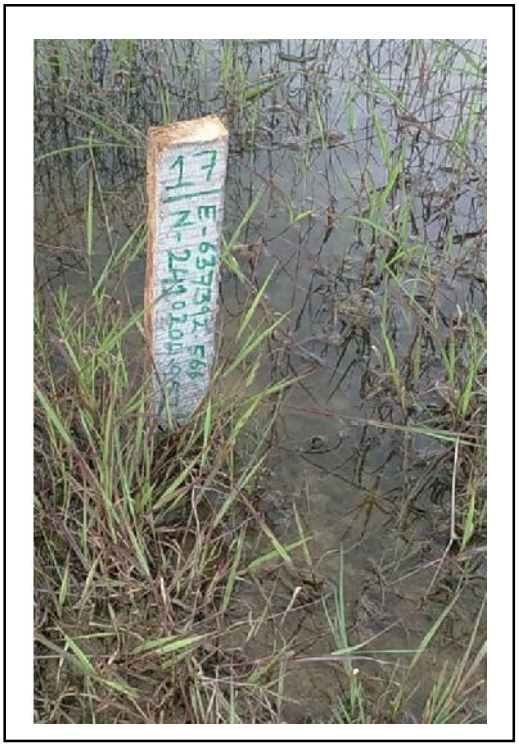
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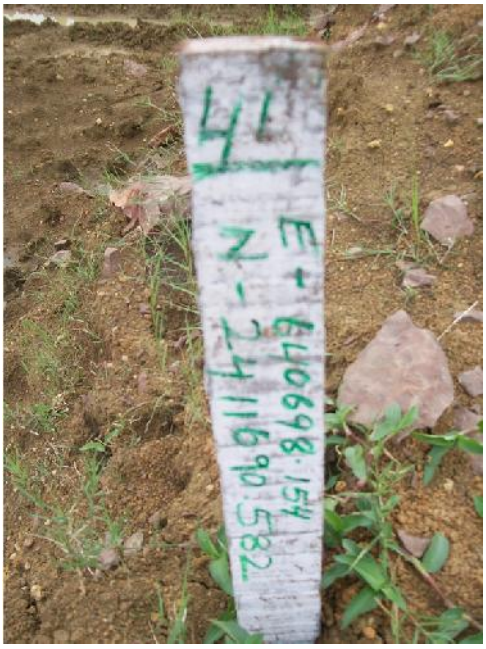
N- 2411690.582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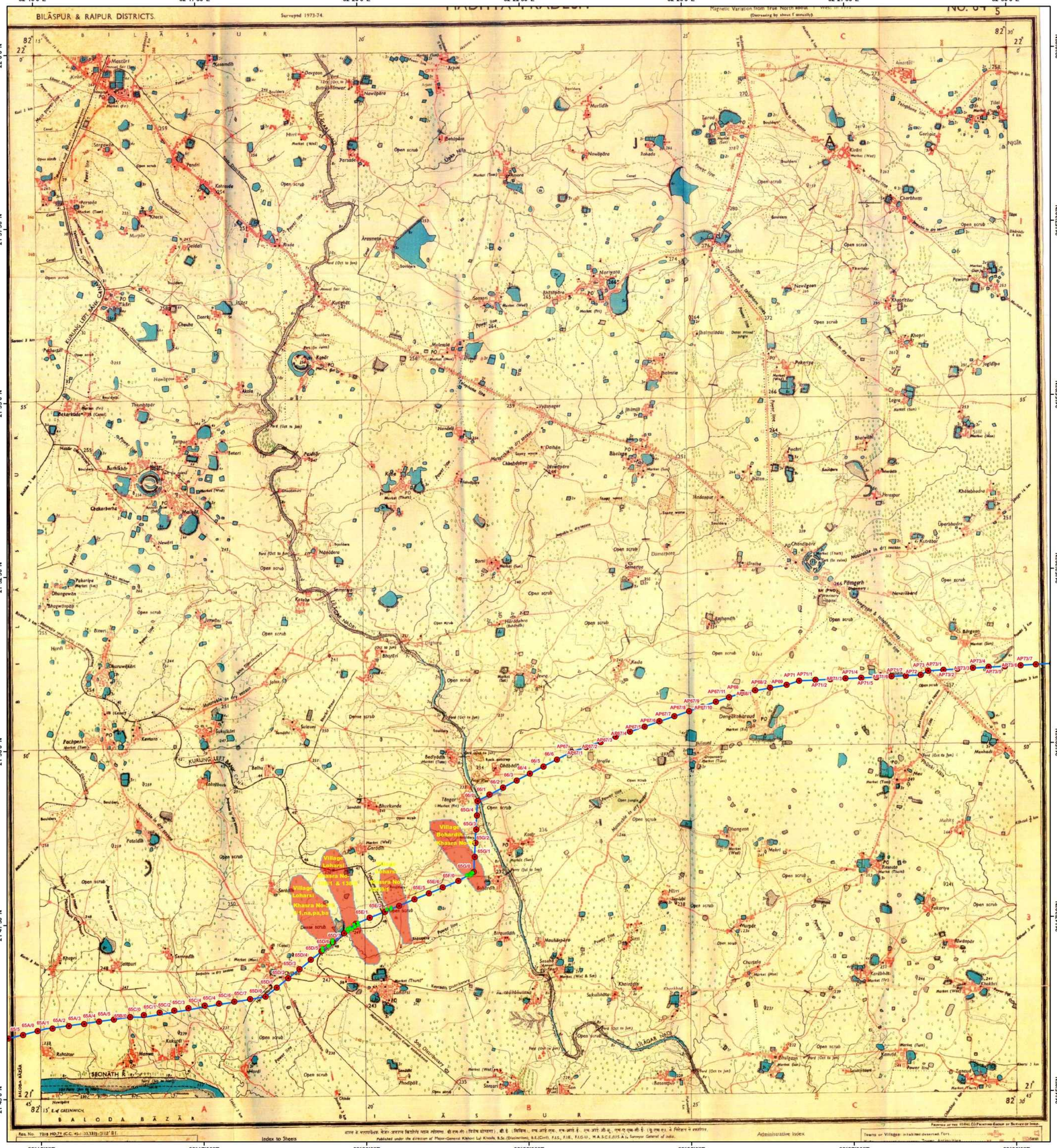
N- 2411690.582

TOPOGRAPHICAL MAP NO. F44Q5 OF LINE SHOWING DGPS CO-ORDINATES IN PROPOSED FOREST DIVERSION AREAS OF 765KV D/C JHARSUGUDA (SUNDARGARH-RAIPUR) TRANSMISSION LINE OF ODISHA GENERATION PHASE-II TRANSMISSION LIMITED (OGPTL) ,BILASPUR FOREST DIVISION, DISTRICT-BILASPUR, CHHATISGARH



Legend

- Forest Pillar
- Forest Patch
- Transmission Line

Sl No	Khasra No	Area in Ha.	Forest Type	Tower Involved	Tower Co-ordinates in Eastrg	Northing
1	3/1	0.017	Bada jhar ki Jungle	65D/5	636685.992	2409599.268
	3/1 ब	0.914	Bada jhar ki Jungle			
2	3/1 प	0.472	Bada jhar ki Jungle	65D/6	636979.235	2409836.202
	3/1 न	0.838	Bada jhar ki Jungle			
3	138/1	0.495	Bada jhar ki Jungle	65D/7	637278.700	2410078.164
4	138/3	1.184	Bada jhar ki Jungle	65E/0	637592.364	2410331.598
5				65E/2	638367.591	2410655.052
6	2839/1	0.170	Bada jhar ki Jungle	65E/3	638741.361	2410811.003
7				65F/0	640309.809	2411465.419
8	91	0.242	Bada jhar ki Jungle	65G/0	640724.000	2411708.000
Total Area		4.330				

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