

**LiDAR / DGPS Survey report for Forest Diversion of  
proposed OFC Cable routes in Gomarda Scanctuary Raigarh  
Division with Route Length 25.640 Km. under (CG) SKY  
Project**

APPLICATION SUBMITTED BY:

**Jio Digital Fibre Private Ltd.**



LIDAR / DGPS SURVEY AND GIS MAPPING DONE BY:

**Genesys International Corporation Limited  
Mumbai, Maharashtra**



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## 1 Introduction and Background

### 1.1 Background

The Chhattisgarh Infotech Promotion Society (CHIPS) has selected an implementation partner (i.e. Jio Digital Fibre Private Ltd.) for Sanchar Kranti Yojna (CG-SKY) project. The Government has taken a leap forward to design the Sanchar Kranti Yojna (CG-SKY) for providing a solution to improve the telecom connectivity in the state of Chhattisgarh by incentivizing the telecom operators to install Cell-Sites. In order to create commercial viability for Telecom operators to invest in the network infrastructure the Government is distributing approx. 50 lakh Smartphones. The primary objective is to ensure the mobile network connectivity is extended to all villages in state of Chhattisgarh with a population of 1000 or above as per the 2011 census and to further strengthen network coverage in all towns and villages, which already have coverage by either erecting new telecom towers or upgradation of existing towers. Based on preliminary assessment, besides the urban areas, approximately 14,000 villages will come under network connectivity and approximately 50,80,000 Smartphones will be distributed under the CG-SKY scheme. The scheme would cover all villages and towns in the State of Chhattisgarh, except those villages having less than 1,000 population and not having connectivity. It may be noted that villages with less than 1,000 population, but having connectivity shall be considered for the CG-SKY.

## 1.2 Proposed Routes

Following image (Fig-1) shows the proposed routes in Gomarda Sanctuary Raigarh Division



Fig-1: OFC Cable Proposed Routes on Online Map in Gomarda Sanctuary Raigarh Division.

### Work Location

The proposed OFC Cable route in Gomarda Sanctuary Raigarh Division (Tehsils covered along the route are: Sarangarh -Gomarda Sanctuary Raigarh Division District: Raigarh. The Division length is approx. 25.640 Km. The survey site passes through forest ranges – Gomarda Sanctuary of Gomarda Sanctuary Raigarh Division. The OFC Cable route is covered under Survey of India Toposheets No. on 64F13, 64O2, 64O3, 64O6, 64O7 RF 1:50000.



Fig-2: OFC Cable Proposed Routes on Satellite Imagery in Gomarda Sanctuary Raigarh Division.

### **1.3 Objective**

As per directives of Ministry of Environment & Forests (MoEF) dated 8th July 2011; all applications for Forest Diversion, under Forest Conservation Act, 1980 must be accompanied with Geo-referenced shape file, showing the boundary of the proposed area (both soft copy and hard copy maps), prepared using Differential GPS (DGPS) and the same should be uploaded to MoEF website along with the online application.

To meet this requirement, Jio Digital Fibre Private Limited entrusted the DGPS survey work to M/s Genesys International Corporation Ltd., Mumbai, through Mobile LiDAR Technology.

## 2 Scope of Work

1. Establishment of one base station with 72 Hours observation and secondary control points at every 10km along the proposed route.
2. DGPS Survey for collection of ground coordinates along the OFC Cable trench at every 50m interval and/or at every turn/bend along the proposed trench. The DGPS data is collected at forest patches only.
3. Data processing and Interpretation
  - a. Geo-referencing of SOI Toposheet (1:50000), Forest Stock map (1:15000, if available) and satellite imagery
  - b. Creation of OFC Cable trench boundary vector map using the DGPS Surveyed data
  - c. Superimposition of cable route layer on Geo-referenced forest maps, SOI Toposheet and Satellite imagery.
  - d. Computation of Forest area proposed for diversion. It includes Reserved/Protected Forest & Revenue Forest.
  - e. Preparation of Geo-referenced forest map at 1:15000 scale, and SOI Toposheet at 1:50000 scale.
  - f. Preparation of DGPS survey report along with soft copy of maps in shapefile format and kml file
4. Printing of report and Geo-referenced maps and Technical compliance.

### 3 Deliverables

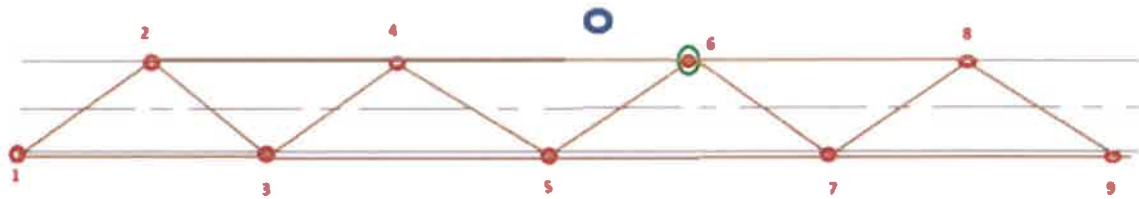
The deliverables envisaged for the assignment are described below

1. Post processed DGPS observations data as well as raw data in RINEX format.
2. DGPS Reports - Base line & network adjustment report for the primary and Secondary Control Points.
3. Geo-referenced SOI maps & forest block maps based on DGPS observations – Hard and Soft Copy (SHP and KML formats).
4. Proposed Forest Diversion area statement as per DGPS Survey
5. DGPS Survey and mapping report

## 4 Technical Approach (Brief Description)

### 4.1 GCP Establishment for LiDAR (DGPS) Survey:

Example of defined Triangular Network GCP method.



-  ⇨ Primary Control Point (PCP)
-  ⇨ Secondary Control Point (SCP)
-  ⇨ Temporary Bench Mark (TBM)

**Primary Control Point:** 72 Hours of DGPS observation for Post Processing the PCP data with IGS stations.

**Secondary Control Point:** 2 - 4 Hours of DGPS observation for Post Processing the SCP data with PCP Data.

**Temporary Bench Mark:** 1 Hour of DGPS observation for improving the spatial accuracy of the LiDAR point cloud data.

#### **4.2 Mobile LiDAR (DGPS) data collection:**

DGPS based Mobile LiDAR data was collected along with 360 degree panoramic view of the OFC route corridor (25 meter on each side along the center of the road).



*Mobile LiDAR Van*

#### **4.3 DRS / GIS Map Creation Using LiDAR data:**

All the features along the route are captured using LiDAR data and Panoramic Imagery to create the DRS / GIS Map.



Feature Extraction on LiDAR



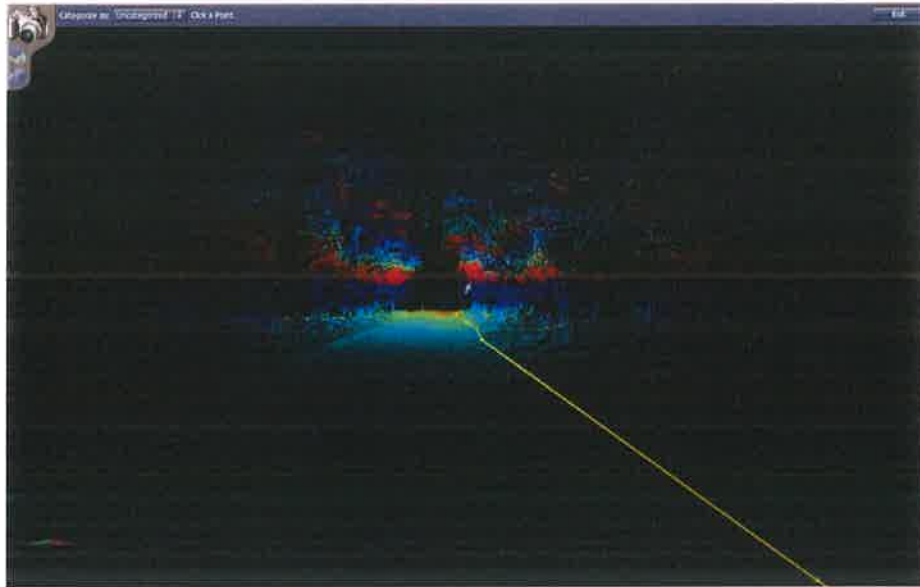
Final DRS / GIS Map

#### **4.4 Demarcation of Proposed OFC on LiDAR data:**

Proposed OFC line is demarcated based on the feasibility of trenching to be done on ground by referring the LiDAR data with the Panoramic imagery.



Proposed OFC Line on LiDAR Data (with Panoramic Imagery)



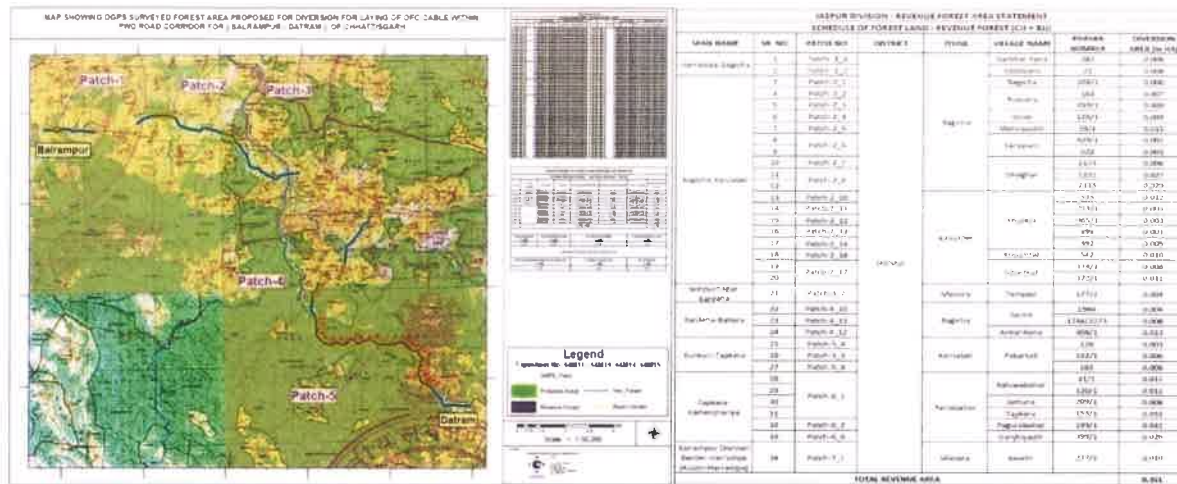
Proposed OFC Line on LiDAR Data only

#### **4.5 Geo-referencing of Maps:**

Geo-referencing of Revenue Village Maps, SOI Toposheets and Forest Maps are to be done. SOI Toposheets and Forest Maps would be geo-referenced based on the coordinates provided on the maps whereas Revenue Village Maps would be geo-referenced with the help of GCPs collected (at least 5 GCPs for a village having Government Forest Land are to be collected)

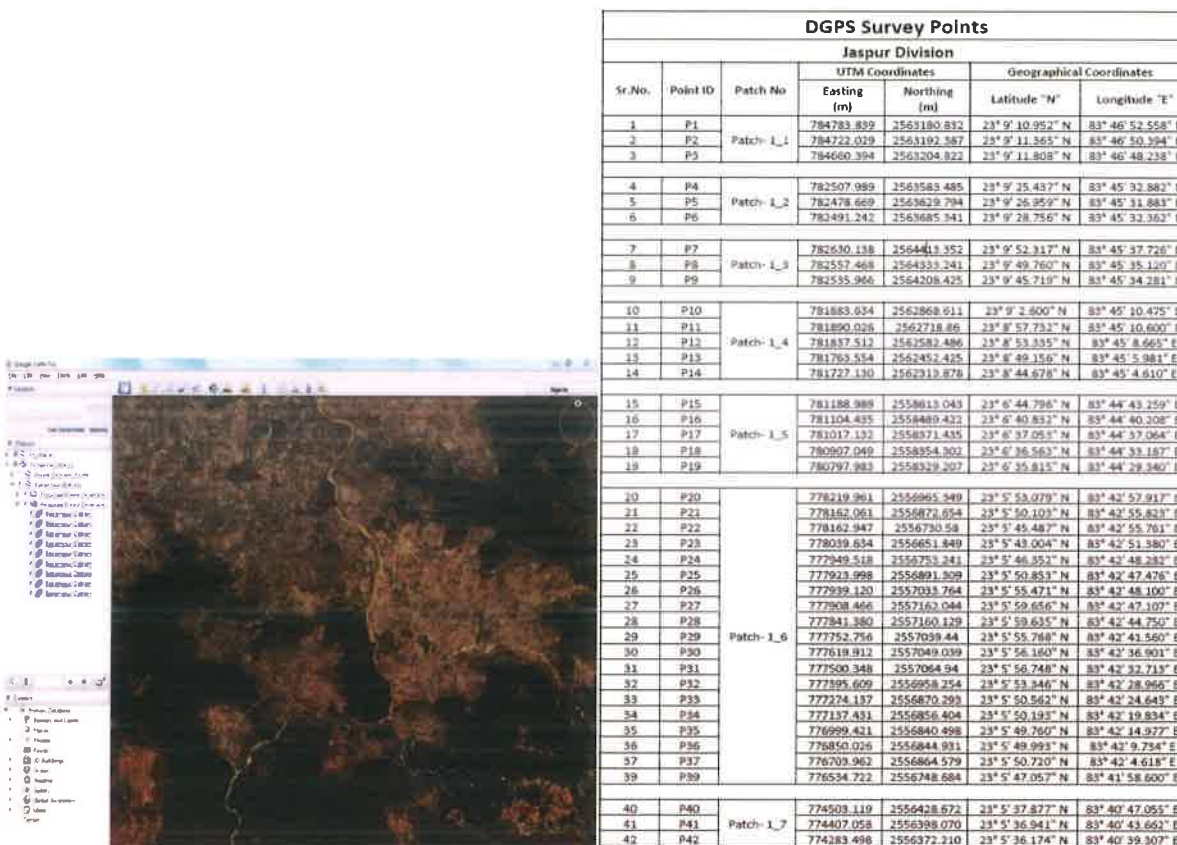
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Geo-referenced Map

Forest Area Statement 1



KML File

DGPS Survey Point Details

| SCHEDULE OF FOREST LAND - RESERVE & PROTECTED FOREST                 |         |                                   |          |                                |              |               |                                     |                        |             |       |  |
|----------------------------------------------------------------------|---------|-----------------------------------|----------|--------------------------------|--------------|---------------|-------------------------------------|------------------------|-------------|-------|--|
| GOMARDA SANCTUARY (RAIGARH DIVISION) - FOREST AREA STATEMENT         |         |                                   |          |                                |              |               |                                     |                        |             |       |  |
| SPAN NAME                                                            | SR. NO. | PATCH NUMBER                      | DIVISION | RANGE                          | VILLAGE NAME | COMPARTMENT   | TYPE OF LAND                        | DIVERSION AREA (in HA) | LENGTH (KM) |       |  |
| Sariya-Sarangarh                                                     | 1       | Patch-1_1                         | Raigarh  | Gomarda Sanctuary              | Malda        | 965           | Reserved Forest                     | 0.106                  | 2.120       |       |  |
|                                                                      | 2       |                                   |          |                                | Chantipali   | 967           |                                     | 0.116                  | 2.320       |       |  |
|                                                                      | 3       |                                   |          |                                | Malda        | 966           |                                     | 0.117                  | 2.340       |       |  |
| Saranggarh-Saraipali                                                 | 4       | Patch-2_1                         |          |                                | Bataupali    | 888           |                                     | 0.025                  | 0.500       |       |  |
|                                                                      | 5       | Patch-2_2                         |          |                                | Khairjhiti   | 931           |                                     | 0.038                  | 0.760       |       |  |
|                                                                      | 6       | Patch-2_6                         |          |                                | Ghorá Ghati  | 928           | Protected Forest                    | 0.133                  | 2.660       |       |  |
|                                                                      | 7       | Patch-2_10                        |          |                                | Saraipali    | 924           | Reserved Forest                     | 0.071                  | 1.420       |       |  |
| TOTAL FOREST AREA                                                    |         |                                   |          |                                |              |               |                                     | 0.606                  | 12.120      |       |  |
|                                                                      |         |                                   |          |                                |              |               |                                     |                        |             |       |  |
| SCHEDULE OF FOREST LAND - REVENUE FOREST (CJJ + BJJ)                 |         |                                   |          |                                |              |               |                                     |                        |             |       |  |
| GOMARDA SANCTUARY (RAIGARH DIVISION) - REVENUE FOREST AREA STATEMENT |         |                                   |          |                                |              |               |                                     |                        |             |       |  |
| SPAN NAME                                                            | SR. NO. | PATCH NUMBER                      | DISTRICT | TEHSIL                         | VILLAGE NAME | KHASRA NUMBER | TYPE OF LAND                        | DIVERSION AREA (in HA) | LENGTH (KM) |       |  |
| Sarangarh-Saraipali                                                  | 1       | Patch-2_1                         | Raigarh  | Sarangarh                      | Manikpur     | 107           | Revenue Forest                      | 0.011                  | 0.220       |       |  |
|                                                                      | 2       |                                   |          |                                |              | 106           |                                     | 0.006                  | 0.120       |       |  |
|                                                                      | 3       |                                   |          |                                |              | 105           |                                     | 0.008                  | 0.160       |       |  |
|                                                                      | 4       | Patch-2_3                         |          |                                | Salar        | 8/1           |                                     | 0.016                  | 0.320       |       |  |
|                                                                      | 5       |                                   |          |                                | Khairjhiti   | 152           |                                     | 0.023                  | 0.460       |       |  |
|                                                                      | 6       |                                   |          |                                | Patch-2_4    | Salar         |                                     | 18                     | 0.003       | 0.060 |  |
|                                                                      | 7       | Patch-2_5                         |          |                                | 15           |               |                                     | 0.008                  | 0.160       |       |  |
|                                                                      | 8       | Patch-2_7                         |          |                                | Kanakbira    | 178           |                                     | 0.025                  | 0.500       |       |  |
|                                                                      | 9       | Patch-2_8                         |          |                                |              | 166/1         |                                     | 0.008                  | 0.160       |       |  |
|                                                                      | 10      | Patch-2_9                         |          |                                | Kanakbira    | 130           |                                     | 0.009                  | 0.180       |       |  |
|                                                                      | 11      | Patch-2_10                        |          |                                | Damdarha     | 1/4           |                                     | 0.018                  | 0.360       |       |  |
|                                                                      | 12      | Patch-2_11                        |          |                                |              | 5             |                                     | 0.01                   | 0.200       |       |  |
|                                                                      | 13      |                                   |          |                                |              | 4             |                                     | 0.015                  | 0.300       |       |  |
|                                                                      | 14      |                                   |          |                                |              | Patch-2_12    |                                     | 178                    | 0.007       | 0.140 |  |
|                                                                      | 15      | Patch-2_13                        |          |                                | Kargipali    | 105/1/k       |                                     | 0.006                  | 0.120       |       |  |
|                                                                      | 16      | Patch-2_14                        |          |                                |              | 159/3         |                                     | 0.002                  | 0.040       |       |  |
|                                                                      | 17      | Patch-2_15                        |          |                                |              | 159/4         |                                     | 0.004                  | 0.080       |       |  |
| TOTAL REVENUE AREA                                                   |         |                                   |          |                                |              |               |                                     | 0.179                  | 3.580       |       |  |
|                                                                      |         |                                   |          |                                |              |               |                                     |                        |             |       |  |
| Total Route Length (in KM)                                           |         | Total Forest Patch Length (in KM) |          | OFC Cable Trench Width (in KM) |              |               | Total Forest Diversion Area (in HA) |                        |             |       |  |
| 25.640                                                               |         | 15.700                            |          | 0.0005                         |              |               | 0.785                               |                        |             |       |  |
| Summary Of Forest And Non Forest Area                                |         |                                   |          |                                |              |               |                                     |                        |             |       |  |
| Protected Forest, Reserved Forest & Orange Area (in HA)              |         |                                   |          | Revenue Forest Area (in HA)    |              |               | Non Forest Area (in HA)             |                        |             |       |  |
| 0.606                                                                |         |                                   |          | 0.179                          |              |               | 0.497                               |                        |             |       |  |

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अधीक्षक  
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सारंगद



वन मण्डलाधिकारी  
शरंगद, वनमण्डल

# DGPS Survey Points

## Gomarda Scanctuary (Raigarh Division)

| Sr.No. | Point ID | Patch No  | UTM Coordinates |              | Geographical Coordinates |                   |
|--------|----------|-----------|-----------------|--------------|--------------------------|-------------------|
|        |          |           | Easting (m)     | Northing (m) | Latitude "N"             | Longitude "E"     |
| 1      | P1       | Patch-1_1 | 732460.57       | 2386756.168  | 21° 34' 7.063" N         | 83° 14' 41.715" E |
| 2      | P2       |           | 732367.3665     | 2386973.169  | 21° 34' 14.159" N        | 83° 14' 38.585" E |
| 3      | P3       |           | 732226.1211     | 2387046.061  | 21° 34' 16.594" N        | 83° 14' 33.714" E |
| 4      | P4       |           | 732135.6786     | 2386821.272  | 21° 34' 9.331" N         | 83° 14' 30.459" E |
| 5      | P5       |           | 731918.2595     | 2386779.883  | 21° 34' 8.087" N         | 83° 14' 22.884" E |
| 6      | P6       |           | 731689.4956     | 2386821.787  | 21° 34' 9.556" N         | 83° 14' 14.956" E |
| 7      | P7       |           | 731461.3672     | 2386743.626  | 21° 34' 7.122" N         | 83° 14' 6.990" E  |
| 8      | P8       |           | 731236.0497     | 2386736.901  | 21° 34' 7.009" N         | 83° 13' 59.158" E |
| 9      | P9       |           | 731020.9738     | 2386772.8    | 21° 34' 8.276" N         | 83° 13' 51.703" E |
| 10     | P10      |           | 730884.4301     | 2386617.69   | 21° 34' 3.298" N         | 83° 13' 46.882" E |
| 11     | P11      |           | 730714.718      | 2386545.484  | 21° 34' 1.030" N         | 83° 13' 40.949" E |
| 12     | P12      |           | 730538.4352     | 2386475.613  | 21° 33' 58.841" N        | 83° 13' 34.789" E |
| 13     | P13      |           | 730406.9125     | 2386523.094  | 21° 34' 0.445" N         | 83° 13' 30.243" E |
| 14     | P14      |           | 730270.4065     | 2386476.099  | 21° 33' 58.981" N        | 83° 13' 25.477" E |
| 15     | P15      |           | 730128.1492     | 2386425.99   | 21° 33' 57.419" N        | 83° 13' 20.509" E |
| 16     | P16      |           | 729978.8943     | 2386393.727  | 21° 33' 56.439" N        | 83° 13' 15.307" E |
| 17     | P17      |           | 729829.159      | 2386386.224  | 21° 33' 56.265" N        | 83° 13' 10.101" E |
| 18     | P18      |           | 729676.9036     | 2386381.406  | 21° 33' 56.178" N        | 83° 13' 4.808" E  |
| 19     | P19      |           | 729533.6522     | 2386412.855  | 21° 33' 57.267" N        | 83° 12' 59.846" E |
| 20     | P20      |           | 729385.1265     | 2386420.663  | 21° 33' 57.589" N        | 83° 12' 54.689" E |
| 21     | P21      |           | 729351.9973     | 2386300.746  | 21° 33' 53.707" N        | 83° 12' 53.479" E |
| 22     | P22      |           | 729317.7963     | 2386169.207  | 21° 33' 49.448" N        | 83° 12' 52.226" E |
| 23     | P23      |           | 729179.2229     | 2386135.438  | 21° 33' 48.414" N        | 83° 12' 47.394" E |
| 24     | P24      |           | 729076.3214     | 2386028.309  | 21° 33' 44.980" N        | 83° 12' 43.766" E |
| 25     | P25      |           | 728951.9386     | 2386124.456  | 21° 33' 48.162" N        | 83° 12' 39.492" E |
| 26     | P26      |           | 728879.5821     | 2386041.46   | 21° 33' 45.498" N        | 83° 12' 36.937" E |
| 27     | P27      |           | 728826.6037     | 2386019.246  | 21° 33' 44.800" N        | 83° 12' 35.085" E |
| 28     | P28      |           | 728718.5402     | 2386113.81   | 21° 33' 47.924" N        | 83° 12' 31.377" E |
| 29     | P29      |           | 728645.9113     | 2386028.283  | 21° 33' 45.177" N        | 83° 12' 28.812" E |
| 30     | P30      |           | 728603.3958     | 2385883.457  | 21° 33' 40.490" N        | 83° 12' 27.263" E |
| 31     | P31      |           | 728521.2728     | 2385756.888  | 21° 33' 36.414" N        | 83° 12' 24.347" E |
| 32     | P32      |           | 728408.5522     | 2385657.199  | 21° 33' 33.226" N        | 83° 12' 20.382" E |
| 33     | P33      |           | 728287.2979     | 2385554.997  | 21° 33' 29.960" N        | 83° 12' 16.119" E |
| 34     | P34      |           | 728142.7533     | 2385514.812  | 21° 33' 28.720" N        | 83° 12' 11.077" E |
| 35     | P35      |           | 727999.1509     | 2385473.073  | 21° 33' 27.429" N        | 83° 12' 6.067" E  |
| 36     | P36      |           | 727852.7806     | 2385440.887  | 21° 33' 26.450" N        | 83° 12' 0.966" E  |
| 37     | P37      |           | 727703.0176     | 2385422.959  | 21° 33' 25.936" N        | 83° 11' 55.754" E |
| 38     | P38      |           | 727554.7301     | 2385422.528  | 21° 33' 25.990" N        | 83° 11' 50.601" E |
| 39     | P39      |           | 727405.9301     | 2385442.481  | 21° 33' 26.707" N        | 83° 11' 45.441" E |
| 40     | P40      |           | 727259.2012     | 2385472.03   | 21° 33' 27.735" N        | 83° 11' 40.358" E |
| 41     | P41      |           | 727172.2278     | 2385493.293  | 21° 33' 28.465" N        | 83° 11' 37.346" E |

# DGPS Survey Points

## Gomarda Scantuary (Raigarh Division)

| Sr.No. | Point ID | Patch No  | UTM Coordinates |              | Geographical Coordinates |                  |
|--------|----------|-----------|-----------------|--------------|--------------------------|------------------|
|        |          |           | Easting (m)     | Northing (m) | Latitude "N"             | Longitude "E"    |
| 42     | P1       | Patch-2_1 | 720345.7087     | 2385725.081  | 21° 33' 39.076" N        | 83° 7' 40.268" E |
| 43     | P2       |           | 720373.7899     | 2385484.636  | 21° 33' 31.248" N        | 83° 7' 41.129" E |
| 44     | P3       |           | 720376.3126     | 2385265.031  | 21° 33' 24.109" N        | 83° 7' 41.113" E |
| 45     | P4       |           | 720362.9887     | 2385066.422  | 21° 33' 17.659" N        | 83° 7' 40.555" E |
| 46     | P5       |           | 720354.47       | 2384892.02   | 21° 33' 11.994" N        | 83° 7' 40.177" E |
| 47     | P6       |           | 720326.9811     | 2384732.742  | 21° 33' 6.829" N         | 83° 7' 39.146" E |
|        |          |           |                 |              |                          |                  |
| 48     | P7       | Patch-2_2 | 720398.4854     | 2383913.239  | 21° 32' 40.161" N        | 83° 7' 41.242" E |
| 49     | P8       |           | 720443.0086     | 2383722.658  | 21° 32' 33.946" N        | 83° 7' 42.698" E |
| 50     | P9       |           | 720531.1464     | 2383528.327  | 21° 32' 27.591" N        | 83° 7' 45.668" E |
| 51     | P10      |           | 720631.0154     | 2383383.951  | 21° 32' 22.854" N        | 83° 7' 49.069" E |
| 52     | P11      |           | 720698.2316     | 2383218.708  | 21° 32' 17.453" N        | 83° 7' 51.326" E |
|        |          |           |                 |              |                          |                  |
| 53     | P12      | Patch-2_3 | 720722.3853     | 2383158.237  | 21° 32' 15.477" N        | 83° 7' 52.137" E |
| 54     | P13      |           | 720786.2525     | 2382990.545  | 21° 32' 9.998" N         | 83° 7' 54.276" E |
| 55     | P14      |           | 720826.2071     | 2382793.354  | 21° 32' 3.570" N         | 83° 7' 55.570" E |
| 56     | P15      |           | 720865.4518     | 2382575.51   | 21° 31' 56.472" N        | 83° 7' 56.830" E |
| 57     | P16      |           | 720908.7208     | 2382399.906  | 21° 31' 50.745" N        | 83° 7' 58.250" E |
|        |          |           |                 |              |                          |                  |
| 58     | P17      | Patch-2_4 | 720919.1799     | 2382371.084  | 21° 31' 49.804" N        | 83° 7' 58.600" E |
| 59     | P18      |           | 720937.3075     | 2382319.776  | 21° 31' 48.128" N        | 83° 7' 59.205" E |
|        |          |           |                 |              |                          |                  |
| 60     | P19      | Patch-2_5 | 720973.4612     | 2382220.397  | 21° 31' 44.882" N        | 83° 8' 0.414" E  |
| 61     | P20      |           | 721027.3318     | 2382070.763  | 21° 31' 39.994" N        | 83° 8' 2.214" E  |
|        |          |           |                 |              |                          |                  |
| 62     | P21      | Patch-2_6 | 720730.5807     | 2380811.71   | 21° 30' 59.202" N        | 83° 7' 51.308" E |
| 63     | P22      |           | 720629.4939     | 2380653.09   | 21° 30' 54.091" N        | 83° 7' 47.722" E |
| 64     | P23      |           | 720569.8398     | 2380425.589  | 21° 30' 46.723" N        | 83° 7' 45.542" E |
| 65     | P24      |           | 720434.9279     | 2380222.52   | 21° 30' 40.182" N        | 83° 7' 40.760" E |
| 66     | P25      |           | 720299.9728     | 2380017.523  | 21° 30' 33.579" N        | 83° 7' 35.975" E |
| 67     | P26      |           | 720177.4301     | 2379808.132  | 21° 30' 26.827" N        | 83° 7' 31.620" E |
| 68     | P27      |           | 720130.6281     | 2379566.661  | 21° 30' 18.999" N        | 83° 7' 29.880" E |
| 69     | P28      |           | 720148.8154     | 2379319.798  | 21° 30' 10.967" N        | 83° 7' 30.395" E |
| 70     | P29      |           | 720166.4954     | 2379077.202  | 21° 30' 3.074" N         | 83° 7' 30.895" E |
| 71     | P30      |           | 720181.6824     | 2378827.085  | 21° 29' 54.937" N        | 83° 7' 31.304" E |
| 72     | P31      |           | 720192.8603     | 2378577.017  | 21° 29' 46.804" N        | 83° 7' 31.574" E |
| 73     | P32      |           | 720124.6167     | 2378350.404  | 21° 29' 39.469" N        | 83° 7' 29.097" E |
|        |          |           |                 |              |                          |                  |
| 74     | P33      | Patch-2_7 | 720065.0423     | 2377889.303  | 21° 29' 24.507" N        | 83° 7' 26.810" E |
| 75     | P34      |           | 720007.1439     | 2377646.038  | 21° 29' 16.626" N        | 83° 7' 24.685" E |
| 76     | P35      |           | 719947.679      | 2377399.236  | 21° 29' 8.630" N         | 83° 7' 22.503" E |

# DGPS Survey Points

## Gomarda Scanctuary (Raigarh Division)

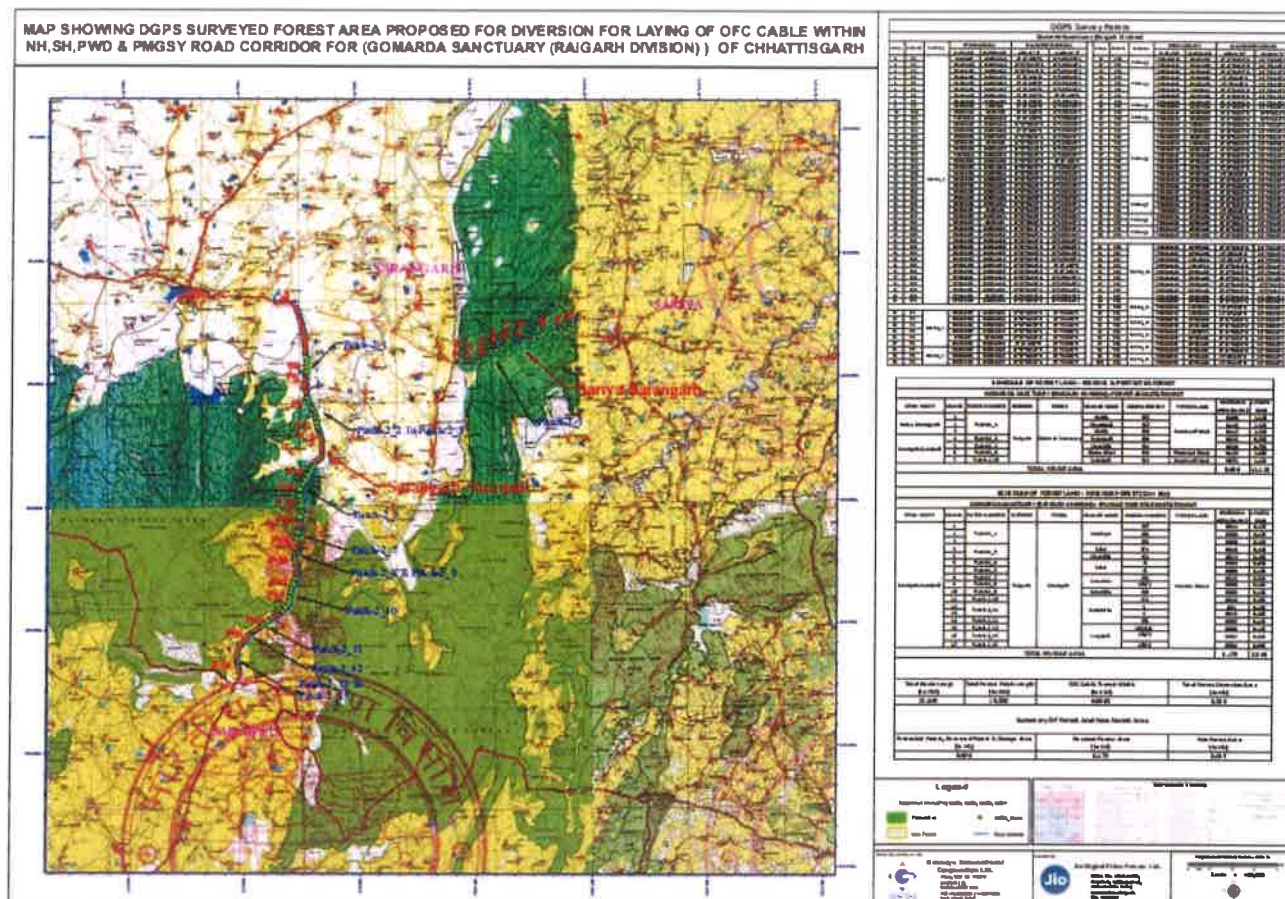
| Sr.No. | Point ID | Patch No   | UTM Coordinates |              | Geographical Coordinates |                  |
|--------|----------|------------|-----------------|--------------|--------------------------|------------------|
|        |          |            | Easting (m)     | Northing (m) | Latitude "N"             | Longitude "E"    |
| 77     | P36      | Patch-2_8  | 719910.4295     | 2376907.409  | 21° 28' 52.660" N        | 83° 7' 20.978" E |
| 78     | P37      |            | 719866.6989     | 2376759.177  | 21° 28' 47.861" N        | 83° 7' 19.389" E |
| 79     | P38      | Patch-2_9  | 719871.3357     | 2376692.697  | 21° 28' 45.698" N        | 83° 7' 19.519" E |
| 80     | P39      |            | 719886.9273     | 2376517.449  | 21° 28' 39.995" N        | 83° 7' 19.978" E |
| 81     | P40      | Patch-2_10 | 719958.2208     | 2375774.911  | 21° 28' 15.828" N        | 83° 7' 22.103" E |
| 82     | P41      |            | 719916.4032     | 2375544.046  | 21° 28' 8.343" N         | 83° 7' 20.543" E |
| 83     | P42      |            | 719817.2945     | 2375329.65   | 21° 28' 1.417" N         | 83° 7' 17.000" E |
| 84     | P43      |            | 719749.5683     | 2375147.12   | 21° 27' 55.514" N        | 83° 7' 14.562" E |
| 85     | P44      |            | 719722.8668     | 2374956.554  | 21° 27' 49.332" N        | 83° 7' 13.546" E |
| 86     | P45      |            | 719695.1928     | 2374752.847  | 21° 27' 42.723" N        | 83° 7' 12.489" E |
| 87     | P46      |            | 719618.2639     | 2374524.682  | 21° 27' 35.340" N        | 83° 7' 9.710" E  |
| 88     | P47      |            | 719482.9142     | 2374335.226  | 21° 27' 29.242" N        | 83° 7' 4.922" E  |
| 89     | P48      |            | 719333.5803     | 2374149.054  | 21° 27' 23.256" N        | 83° 6' 59.649" E |
| 90     | P49      | Patch-2_11 | 718852.6074     | 2373850.753  | 21° 27' 13.771" N        | 83° 6' 42.809" E |
| 91     | P50      |            | 718649.6939     | 2373704.46   | 21° 27' 9.105" N         | 83° 6' 35.695" E |
| 92     | P51      |            | 718437.9122     | 2373569.59   | 21° 27' 4.814" N         | 83° 6' 28.279" E |
| 93     | P52      | Patch-2_12 | 718053.9253     | 2373250.132  | 21° 26' 54.598" N        | 83° 6' 14.797" E |
| 94     | P53      |            | 717918.2729     | 2373218.693  | 21° 26' 53.635" N        | 83° 6' 10.073" E |
| 95     | P54      | Patch-2_13 | 717336.7561     | 2372097.73   | 21° 26' 17.452" N        | 83° 5' 49.361" E |
| 96     | P55      |            | 717341.4824     | 2371984.446  | 21° 26' 13.767" N        | 83° 5' 49.473" E |
| 97     | P56      | Patch-2_14 | 717343.7301     | 2371931.212  | 21° 26' 12.036" N        | 83° 5' 49.526" E |
| 98     | P57      |            | 717346.3979     | 2371882.751  | 21° 26' 10.460" N        | 83° 5' 49.596" E |
| 99     | P58      | Patch-2_15 | 717348.9261     | 2371836.736  | 21° 26' 8.963" N         | 83° 5' 49.662" E |
| 100    | P59      |            | 717355.1392     | 2371766.388  | 21° 26' 6.674" N         | 83° 5' 49.845" E |

महाराष्ट्र वन परिक्षेत्र अधिकारी  
गोमर्दा अभ्यारण्य, रायगड (उ.प्र.)

अधीक्षक  
गोमर्दा व.प्रा. अभ्यारण्य  
रायगड



### 5.3 Geo-Referenced Maps of the Proposed Route (Annexure-3):



## 5.4 DGPS Maps of the Proposed Route (Annexure-4):

