

DGPS SURVEY REPORT

FOR

(WIDENING & UPGRADING TO 2/4 LANE WITH PAVED SHOULDER
OF NH-930 , from DHANORA TO KOHKA IN THE STATE OF
CHHATTISGARH.)

(Approximate Length of 85 km)

BALOD FOREST DIVISION

AREA : 26.47131 Hect.



Report Prepared by.

SAN SURVEY ENGINEERING

HOOGLY (W.B.)

& S S ENGINEERING SOLUTIONS

RAIPUR (CHHATTISGARH)

Submitted by
Executive Engineer
PWD , NH Division No. 1
Raipur (Chhattisgarh)

To,
Divisional Forest Officer
Balod Forest Division
Balod (Chhattisgarh)

INTRODUCTION TO DGPS

WHAT IS DGPS AND WHY USE IT?

- **Differential Global Positioning System (DGPS)** is an enhancement to Global Positioning System that provides improved location accuracy, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations.
 - DGPS refers to using a combination of receivers and satellites to reduce/eliminate common receiver based and satellite based errors reduce orbit errors reduce ionospheric and tropospheric errors reduce effects of SA eliminate satellite and receiver clock errors
 - improve accuracy significantly 100's of metres to metres to centimetres to millimetres
1. DGPS uses one or several (network) fixed ground based reference stations (in known locations).
 2. The base station compares its own known location, to that computed from a GPS receiver.
 3. Any difference is then broadcast as a correction to the user.

Correction signals can be broadcast either from ground stations, or via additional satellites. These services are privately owned and usually require a user subscription.

Examples:

- Satellite Based Augmentation System (SBAS),
- Wide Area Augmentation System (WAAS),
- Local Area Augmentation System (LAAS),
- European Geostationary Navigation Overlay Service (EGNOS),
- Omni STAR
- Coast guard beacon service.

Why do we Need Differential GPS?

By using DGPS we can improve our positional accuracy from around 1.5m with standard GPS to around 40cm with DGPS, without the need for post processing.

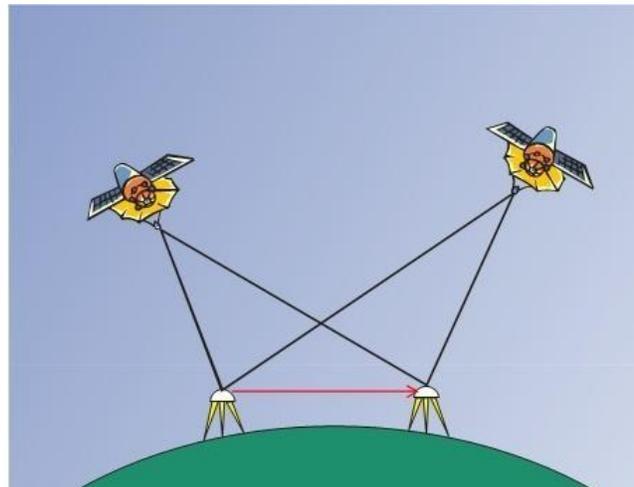
In the case of the road survey van (top right), users can measure the amount of road wear and judge whether the road should be resurfaced just

by driving over it. Just one day's driving can replace a month's manual work using traditional methods.

There are many other applications like this. The labour saving is immense but at the same time, previously impossible tasks are made possible such as the prediction of earthquakes before they occur.

DGPS Summary

- Term refers to simple C/A code differential
- Available on GPS receivers from low cost to high cost
- Produces accuracies from sub-metre to metres
- Many real-time DGPS correction providers - Coast guard, EGNOS, OmniSTAR
- Used for many different applications including marine navigation, precision farming and vehicle testing applications.



What is RTK?

Real Time Kinematic is an advanced form of DGPS which uses the satellites carrier wave to compare 2 observations from different receivers

within the system, to fine tune the satellite and receiver clock errors, thus improving positional accuracy.

Real Time Kinematic (RTK)

The GPS signal is made up of 3 distinct components:

- Carrier wave
- GPS Code
- Navigation message

Typical GPS receivers will use the GPS navigation message to calculate its position. RTK uses the carrier wave of the GPS signal, which is 19.02cm long. By counting the number of cycles (and phase of the carrier), the travel time and distance can be measured more accurately.

RTK Summary

- Similar technique as DGPS that uses the carrier phase to provide more accurate positioning
- Cost is higher compared to DGPS receivers
- Produces accuracies from 20 cm to sub-centimetres
- RTK corrections provided via a local base station or by a private correction provider - OmniSTAR, Leica, Trimble

- Used for many different applications including machine control (construction, container ports, farming), vehicle testing applications, surveying (land, marine, hydrographic, aerial)

RINEX FILE

The first proposal for the ***Receiver Independent Exchange Format*** **RINEX** was developed by the Astronomical Institute of the University of Berne for the easy exchange of the Global

Positioning System (GPS) data to be collected during the first large European GPS campaign

EUREF 89, which involved more than 60 GPS receivers of 4 different manufacturers. The governing aspect during the development was the following fact:

Most geodetic processing software for GPS data use a well-defined set of observables:

- The carrier-phase measurement at one or both carriers (actually being a measurement on the beat frequency between the received carrier of the satellite signal and a receiver-generated reference frequency).
- The pseudorange (code) measurement, equivalent to the difference of the time of reception (expressed in the time frame of the receiver) and the time of transmission (expressed in the time frame of the satellite) of a distinct satellite signal.
- The observation time being the reading of the receiver clock at the instant of validity of the carrier-phase and/or the code measurements. Usually the

software assumes that the observation time is valid for both the phase **and** the code measurements, **and** for all satellites observed. Consequently all these programs do not need most of the information that is usually stored by the receivers: They need phase, code, and time in the above mentioned definitions, and some stationrelated information like station name, antenna height, etc. Up till now two major format versions have been developed and published:

- The original RINEX Version 1 presented at and accepted by the 5th International Geodetic Symposium on Satellite Positioning in Las Cruces, 1989. [Gurtner et al. 1989],[Evans 1989]
- RINEX Version 2 presented at and accepted by the Second International Symposium of Precise Positioning with the Global Positioning system in Ottawa, 1990, mainly adding the possibility to include tracking data from different satellite systems (GLONASS, SBAS). [Gurtner and Mader 1990a, 1990b], [Gurtner 1994]. Several subversions of RINEX Version 2 have been defined:
 - Version 2.10: Among other minor changes allowing for sampling rates other than integer seconds and including raw signal strengths as new observables. [Gurtner 2002]
 - Version 2.11: Includes the definition of a two-character observation code for L2C pseudoranges and some modifications in the GEO NAV MESS files [Gurtner and Estey 2005]
 - Version 2.20: Unofficial version used for the exchange of tracking data from spaceborne receivers within the IGS LEO pilot project [Gurtner and Estey 2002]. As spin-offs of this idea of a receiver-independent GPS

exchange format other RINEX-like exchange file formats have been defined, mainly used by the International GNSS Service IGS:

- Exchange format for **satellite and receiver clock offsets** determined by processing data of a GNSS tracking network [Ray and Gurtner 1999]
- Exchange format for the complete **broadcast data of spacebased augmentation systems** SBAS. [Suard et al. 2004]
- IONEX: Exchange format for **ionosphere models** determined by processing data of a GNSS tracking network [Schaer et al. 1998]
- ANTEX: Exchange format for **phase center variations** of geodetic GNSS antennae [Rothacher and Schmid 2005].

The upcoming European Navigation Satellite System Galileo and the enhanced GPS with new frequencies and observation types, especially the possibility to track frequencies on different channels, ask for a more flexible and more detailed definition of the observation codes. To improve the handling of the data files in case of "mixed" files, i.e. files containing tracking data of more than one satellite system, each one with different observation types, the record structure of the data record has been modified significantly and, following several requests, the limitation to 80 characters length has been removed. As the changes are quite significant, they lead to a new RINEX Version 3. The new version also includes the unofficial Version 2.20 definitions for space-borne receivers. The major change asking for a version 3.01 was the requirement to generate consistent phase observations across different tracking modes or channels, i.e. to apply $\frac{1}{4}$ -cycle shifts prior to RINEX file generation, if necessary, to facilitate the processing of such data.

The RINEX version 3.00 format consists of three ASCII file types:

1. Observation data File
2. Navigation message File
3. Meteorological data File

Each file type consists of a header section and a data section. The header section contains global information for the entire file and is placed at the beginning of the file. The header section contains **header labels in columns 61-80** for each line contained in the header section. These labels are mandatory and must appear exactly as given in these descriptions and examples. The format has been optimized for minimum space requirements independent from the number of different observation

types of a specific receiver or satellite system by indicating in the header the types of observations to be stored for this receiver and the satellite systems having been observed. In computer systems allowing variable record lengths the observation records may be kept as short as possible. Trailing blanks can be removed from the records. There is no maximum record length limitation for the observation records.

Each Observation file and each Meteorological Data file basically contain the data from one site and one session. Starting with Version 2 RINEX also allows including observation data from more than one site subsequently occupied by a roving receiver in rapid static or kinematic applications. Although Version 2 and higher allow to insert header records into the data section it is not recommended to concatenate data of more than one receiver (or antenna) into the same file, even if the data do not overlap in

time. If data from more than one receiver have to be exchanged, it would not be economical to include the identical satellite navigation messages collected by the different receivers several times. Therefore the navigation message file from one receiver may be exchanged or a composite navigation message file created containing non-redundant information from several receivers in order to make the most complete file. The format of the data records of the RINEX Version 1 navigation message file was identical to the former NGS exchange format. RINEX version 3 navigation message files may contain navigation messages of more than one satellite system (GPS, GLONASS, Galileo, Quasi Zenith Satellite System (QZSS), BeiDou System (BDS) and SBAS).

The actual format descriptions as well as examples are given in the Appendix Tables at the end of the document.

BASIC DEFINITIONS

Time:

The time of the measurement is the receiver time of the received signals. It is identical for the phase and range measurements and is identical for all satellites observed at that epoch. For single-system data files it is by default expressed in the time system of the respective satellite system. Otherwise the actual time can (for mixed files must) be indicated in the Start Time header record.

Pseudo-Range:

The pseudo-range (PR) is the distance from the receiver antenna to the satellite antenna including receiver and satellite clock offsets (and other

biases, such as atmospheric delays): $PR = \text{distance} + c * (\text{receiver clock offset} - \text{satellite clock offset} + \text{other biases})$

so that the pseudo-range reflects the actual behaviour of the receiver and satellite clocks. The pseudo-range is stored in units of meters.

Phase:

The phase is the carrier-phase measured in whole cycles. The halfcycles measured by squaring type receivers must be converted to whole cycles and flagged by the respective observation code.

The phase changes in the same sense as the range (negative doppler). The phase observations between epochs must be connected by including the integer number of cycles. The observables are not corrected for external effects like atmospheric refraction, satellite clock offsets, etc. If necessary phase observations are corrected for phase shifts needed to guarantee consistency between phases of the same frequency and satellite system based on different signal channels.

If the receiver or the converter software adjusts the measurements using the real-time-derived receiver clock offsets $dT(r)$, the consistency of the 3

quantities phase / pseudo-range / epoch must be maintained, i.e. the receiver clock correction should be applied to all 3 observables:

$$1 \text{ Time (corr)} = \text{Time}(r) - dT(r)$$

$$2 \text{ PR (corr)} = \text{PR}(r) - dT(r) * c \quad 3 \quad \text{phase}$$

$$\text{(corr)} = \text{phase}(r) - dT(r) * \text{freq}$$

Doppler:

The sign of the doppler shift as additional observable is defined as usual:
Positive for approaching satellites.

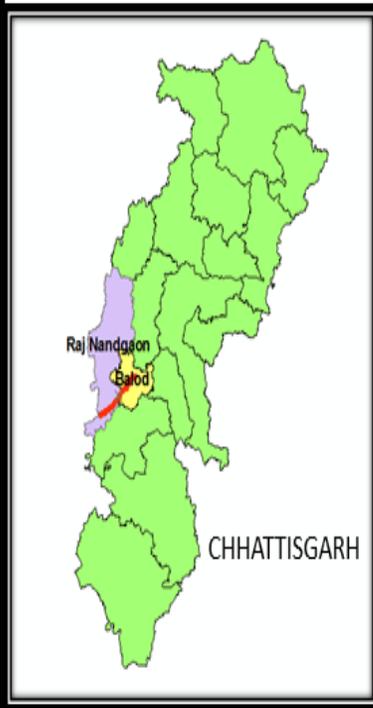
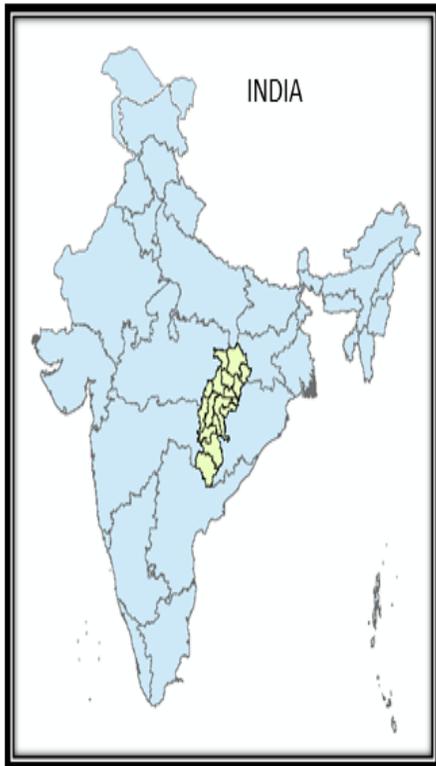
Satellite numbers:

Starting with RINEX Version 2 the former two-digit satellite numbers **nn** are preceded by a one-character system identifier **s**. The same satellite system identifiers are also used in all header records when appropriate.

THE EXCHANGE OF RINEX FILES:

The original RINEX file naming convention was implemented in the MSDOS era when file names were restricted to 8.3 characters. Modern operating systems typically support 255 character file names. The goal of the new file naming convention is to be more: descriptive, flexible and extensible than the RINEX 2.11 file naming convention. All elements are fixed length and are separated by an underscore "_" except for the: file type and compression fields that uses a period "." separator. Fields must be padded with zeros to fill the field width. The file compression field is optional. In order to further reduce the size of observation files Yuki Hatanaka developed a compression scheme that takes advantage of the structure of the RINEX observation data by forming higher order differences in time between observations of the same type and satellite. This compressed file is also an ASCII file that is subsequently compressed again using the above mentioned standard compression programs

Location Plan



DETAILS OF FOREST LAND

Sr. No.	FOREST	FOREST	DISTRICT	Village	COMPARTMENT	R.F./P.F.	AREA (HECT.)
	DIVISION	RANGE			NO.		
1	Balod	Balod	Balod	Balod	99	RF	6.50929
2				Balod	98	RF	2.36493
3				Daihan	97	RF	4.71574
4				Bangaon	92	RF	2.65311
5				Borid	P257	PF	1.5285
6		Dalli		Jhikatola	148	RF	1.14619
7				Hitkasa	170	RF	4.78844
8		Doundi		Paindhur	163	RF	1.26639
9				Bitejhar	164	RF	0.44872
						TOTAL	25.42131

DETAILS OF REVENUE FOREST LAND

Sr. No.	DISTRICT	TEHSIL	Village	Khasra No.	Area(In Hect.)
1.	Balod	Doundi	Danitola	307	1.05
				Total	1.05

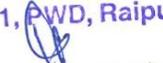
Protected Forest : 1.5285

Reserved Forest : 23.89281

Revenue Forest : 1.05

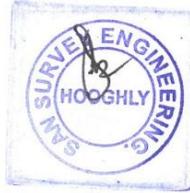
TOTAL FOREST AREA : 26.47131 Hect.


Executive Engineer
NH.Dn. 1, PWD, Raipur


वन परिक्षेत्र अधिकारी

दल्ली राजहरा

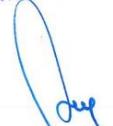
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वन परिक्षेत्र अधिकारी
बालोद परिक्षेत्र


वन परिक्षेत्र अधिकारी
डौण्डी


उप वन मंडलाधिकारी
उप वनमण्डल-दल्ली
वनमण्डल बालोद (उ.ग.)


उप वनमण्डलाधिकारी
बालोद


वन मंडलाधिकारी
बालोद वनमंडल, बालोद

COORDINATE LIST

Balod Forest Division
Balod Forest Range

AREA 17.77157 HECTARES

Date of Survey Dec. 18th to 24th 2016 Time 10:30 to 17:12

BASE STATION POINT

S.No.	Pillar ID	LONGITUDE_DMS	LATTITUDE_DMS
1	Base Point1	E81°08'01.09"	N20°41'16.24"

DGPS SURVEY POINTS

Sl. No	Latitude (DMS)	Longitude (DMS)	Description
1	N20°43'05.40"	E81°11'11.05"	PL1
2	N20°43'06.18"	E81°11'11.12"	PR1
3	N20°43'06.80"	E81°11'06.00"	PL2
4	N20°43'06.03"	E81°11'05.89"	PR2
5	N20°43'05.99"	E81°11'02.61"	PL3
6	N20°43'07.09"	E81°11'03.05"	PR3
7	N20°43'06.40"	E81°10'59.45"	PR4
8	N20°43'05.27"	E81°10'59.23"	PL4
9	N20°43'04.78"	E81°10'58.04"	PL5
10	N20°43'05.42"	E81°10'57.52"	PR5
11	N20°43'03.99"	E81°10'54.50"	PR6
12	N20°43'03.28"	E81°10'54.84"	PL6
13	N20°43'01.71"	E81°10'51.46"	PL7
14	N20°43'02.41"	E81°10'51.10"	PR7
15	N20°42'59.75"	E81°10'44.91"	PR8
16	N20°42'59.04"	E81°10'45.24"	PL8
17	N20°42'57.94"	E81°10'42.71"	PL9
18	N20°42'58.67"	E81°10'42.40"	PR9

19	N20°42'57.65"	E81°10'40.19"	PR10
20	N20°42'56.96"	E81°10'40.57"	PL10
21	N20°42'54.11"	E81°10'34.47"	PL11
22	N20°42'54.93"	E81°10'34.07"	PR11
23	N20°42'53.80"	E81°10'31.15"	PR12
24	N20°42'52.79"	E81°10'31.53"	PL12
25	N20°42'52.27"	E81°10'27.84"	PL13
26	N20°42'53.15"	E81°10'27.78"	PR13
27	N20°42'52.22"	E81°10'20.84"	PR14
28	N20°42'51.43"	E81°10'20.95"	PL14
29	N20°42'51.31"	E81°10'14.06"	PR15
30	N20°42'50.52"	E81°10'14.10"	PL15
31	N20°42'50.39"	E81°10'07.21"	PR16
32	N20°42'49.61"	E81°10'07.29"	PL16
33	N20°42'48.73"	E81°10'00.61"	PL17
34	N20°42'49.51"	E81°10'00.55"	PR17
35	N20°42'48.93"	E81°09'56.43"	PR18
36	N20°42'48.17"	E81°09'56.61"	PL18
37	N20°42'47.68"	E81°09'53.62"	PL19
38	N20°42'48.44"	E81°09'53.46"	PR19
39	N20°42'47.36"	E81°09'46.87"	PR20
40	N20°42'46.59"	E81°09'46.99"	PL20
41	N20°42'45.87"	E81°09'43.73"	PL21
42	N20°42'46.61"	E81°09'43.48"	PR21
43	N20°42'45.32"	E81°09'40.10"	PR22
44	N20°42'44.64"	E81°09'40.51"	PL22
45	N20°42'41.63"	E81°09'34.38"	PL23
46	N20°42'42.29"	E81°09'33.96"	PR23
47	N20°42'38.50"	E81°09'27.95"	PR24
48	N20°42'37.87"	E81°09'28.45"	PL24
49	N20°42'34.39"	E81°09'23.02"	PL25
50	N20°42'35.03"	E81°09'22.56"	PR25
51	N20°42'31.42"	E81°09'16.78"	PR26
52	N20°42'30.78"	E81°09'17.24"	PL26
53	N20°42'27.28"	E81°09'11.54"	PL27
54	N20°42'27.92"	E81°09'11.07"	PR27
55	N20°42'24.39"	E81°09'05.24"	PR28
56	N20°42'23.72"	E81°09'05.68"	PL28

57	N20°42'20.18"	E81°08'59.93"	PL29
58	N20°42'20.83"	E81°08'59.48"	PR29
59	N20°42'17.21"	E81°08'53.72"	PR30
60	N20°42'16.54"	E81°08'54.15"	PL30
61	N20°42'12.92"	E81°08'48.47"	PL31
62	N20°42'13.54"	E81°08'47.97"	PR31
63	N20°42'09.91"	E81°08'42.26"	PR32
64	N20°42'09.25"	E81°08'42.70"	PL32
65	N20°42'05.51"	E81°08'36.88"	PL33
66	N20°42'06.17"	E81°08'36.45"	PR33
67	N20°42'04.67"	E81°08'34.16"	PR34
68	N20°42'03.88"	E81°08'34.77"	PL34
69	N20°42'00.50"	E81°08'31.87"	PL35
70	N20°42'01.87"	E81°08'31.54"	PR35
71	N20°41'59.15"	E81°08'30.07"	PR36
72	N20°41'57.55"	E81°08'30.63"	PL36
73	N20°41'56.19"	E81°08'30.33"	PL37
74	N20°41'56.33"	E81°08'29.30"	PR37
75	N20°41'49.75"	E81°08'29.37"	PR38
76	N20°41'49.78"	E81°08'30.19"	PL38
77	N20°41'47.49"	E81°08'30.25"	PL39
78	N20°41'47.49"	E81°08'29.42"	PR39
79	N20°41'45.89"	E81°08'29.37"	PR40
80	N20°41'45.84"	E81°08'30.20"	PL40
81	N20°41'41.40"	E81°08'29.59"	PL41
82	N20°41'42.99"	E81°08'28.87"	PR41
83	N20°41'39.81"	E81°08'28.18"	PR42
84	N20°41'38.08"	E81°08'28.86"	PL42
85	N20°41'35.04"	E81°08'28.00"	PL43
86	N20°41'36.63"	E81°08'27.44"	PR43
87	N20°41'33.65"	E81°08'26.21"	PR44
88	N20°41'32.12"	E81°08'26.45"	PL44
89	N20°41'29.64"	E81°08'24.19"	PR45
90	N20°41'31.02"	E81°08'24.20"	PL46
91	N20°41'28.97"	E81°08'21.58"	PR46
92	N20°41'27.71"	E81°08'21.41"	PL46
93	N20°41'26.01"	E81°08'18.44"	PL47
94	N20°41'27.29"	E81°08'18.68"	PR47

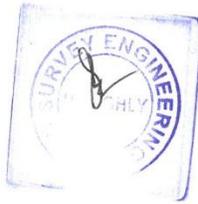
95	N20°41'25.56"	E81°08'15.65"	PR48
96	N20°41'24.33"	E81°08'15.49"	PL48
97	N20°41'22.64"	E81°08'12.53"	PL49
98	N20°41'23.89"	E81°08'12.71"	PR49
99	N20°41'22.20"	E81°08'09.77"	PR50
100	N20°41'20.70"	E81°08'09.22"	PL50
101	N20°41'18.87"	E81°08'06.96"	PL51
102	N20°41'20.24"	E81°08'06.95"	PR51
103	N20°41'17.77"	E81°08'04.72"	PR52
104	N20°41'16.26"	E81°08'04.96"	PL52
105	N20°41'13.25"	E81°08'03.74"	PL53
106	N20°41'14.84"	E81°08'03.16"	PR53
107	N20°41'11.65"	E81°08'02.40"	PR54
108	N20°41'10.05"	E81°08'03.37"	PL54
109	N20°41'06.87"	E81°08'03.88"	PL55
110	N20°41'08.39"	E81°08'02.48"	PR55
111	N20°41'05.23"	E81°08'03.38"	PR56
112	N20°41'03.85"	E81°08'05.16"	PL56
113	N20°41'03.48"	E81°08'04.20"	PR57


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वन परिक्षेत्र अधिकारी
बालोद परिक्षेत्र


वन परिक्षेत्र अधिकारी
डौणडी


वन परिक्षेत्र अधिकारी
दल्ली राजहरा




उप वन मंडलाधिकारी
उप वनमण्डल दल्ली
वनमण्डल बालोद


उप वनमण्डलाधिकारी
बालोद


वन मंडलाधिकारी
बालोद वनमंडल, शालोद

Dalli Forest Range

AREA 5.93463 HECTARES

Date of Survey Dec. 18th to 24th 2016 Time 10:30 to 17:12

BASE STATION POINT

S.No.	Pillar ID	LONGITUDE_DMS	LATTITUDE_DMS
1	Base Point1	E81°00'52.75"	N20°35'23.19"

DGPS SURVEY POINTS

Sl. No	Latitude (DMS)	Longitude (DMS)	Description
114	N20°35'22.80"	E81°00'50.80"	DL6
115	N20°35'23.53"	E81°00'50.52"	DR6
116	N20°35'22.68"	E81°00'48.16"	DR7
117	N20°35'21.91"	E81°00'48.39"	DL7
118	N20°35'21.05"	E81°00'46.81"	DL8
119	N20°35'21.71"	E81°00'46.37"	DR8
120	N20°35'17.97"	E81°00'41.18"	DR9
121	N20°35'17.35"	E81°00'41.68"	DL9
122	N20°35'13.81"	E81°00'36.42"	DL10
123	N20°35'14.52"	E81°00'36.08"	DR10
124	N20°35'12.28"	E81°00'29.47"	DR11
125	N20°35'11.55"	E81°00'29.78"	DL11
126	N20°35'10.21"	E81°00'25.38"	DL12
127	N20°35'10.95"	E81°00'25.14"	DR12
128	N20°35'09.68"	E81°00'20.96"	DR13
129	N20°35'08.95"	E81°00'21.26"	DL13
130	N20°35'07.87"	E81°00'18.00"	DL14
131	N20°35'08.90"	E81°00'17.38"	DR14
132	N20°35'07.51"	E81°00'15.16"	DR15
133	N20°35'06.25"	E81°00'15.01"	DL15
134	N20°35'04.56"	E81°00'12.81"	DL16
135	N20°35'05.14"	E81°00'12.26"	DR16

136	N20°35'00.21"	E81°00'06.19"	DR17
137	N20°34'59.68"	E81°00'06.81"	DL17
138	N20°34'55.78"	E81°00'01.88"	DL18
139	N20°34'56.39"	E81°00'01.35"	DR18
140	N20°34'52.35"	E80°59'55.94"	DR19
141	N20°34'51.75"	E80°59'56.48"	DL19
142	N20°34'49.52"	E80°59'53.45"	DL20
143	N20°34'50.12"	E80°59'52.91"	DR20
144	N20°35'43.22"	E81°01'23.98"	DR1
145	N20°35'42.28"	E81°01'24.33"	DL1
146	N20°35'41.36"	E81°01'21.77"	DL2
147	N20°35'42.10"	E81°01'21.39"	DR2
148	N20°35'40.56"	E81°01'17.99"	DR3
149	N20°35'39.89"	E81°01'18.46"	DL3
150	N20°35'37.15"	E81°01'17.09"	DL4
151	N20°35'38.31"	E81°01'15.94"	DR4


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डौण्डी


वन परिक्षेत्र अधिकारी
दल्ली राजहरा




उप वन मंडलाधिकारी
उप वनमण्डल दल्ली
वनमण्डल बालोद (छ.प.)


उप वनमण्डलाधिकारी
बालोद


वन मंडलाधिकारी
बालोद वनमंडल, बालोद

Doundi Forest Range

AREA 1.71511 HECTARES

Date of Survey Dec. 18th to 24th 2016 Time 10:30 to 17:12

BASE STATION POINT

S.No.	Pillar ID	LONGITUDE_DMS	LATTITUDE_DMS
1	Base Point1	E80°57'29.60"	N20°31'49.48"

DGPS SURVEY POINTS

Sl. No	Latitude (DMS)	Longitude (DMS)	Description
152	N20°35'35.13"	E81°01'15.44"	DR5
153	N20°32'28.32"	E80°57'54.63"	BT1
154	N20°31'45.77"	E80°57'28.73"	BT10
155	N20°32'24.80"	E80°57'52.93"	BT2
156	N20°32'19.32"	E80°57'49.68"	BT3
157	N20°32'13.99"	E80°57'46.14"	BT4
158	N20°32'08.09"	E80°57'42.03"	BT5
159	N20°32'02.45"	E80°57'38.37"	BT6
160	N20°31'56.55"	E80°57'35.78"	BT7
161	N20°31'50.60"	E80°57'32.51"	BT8
162	N20°31'48.58"	E80°57'30.94"	BT9


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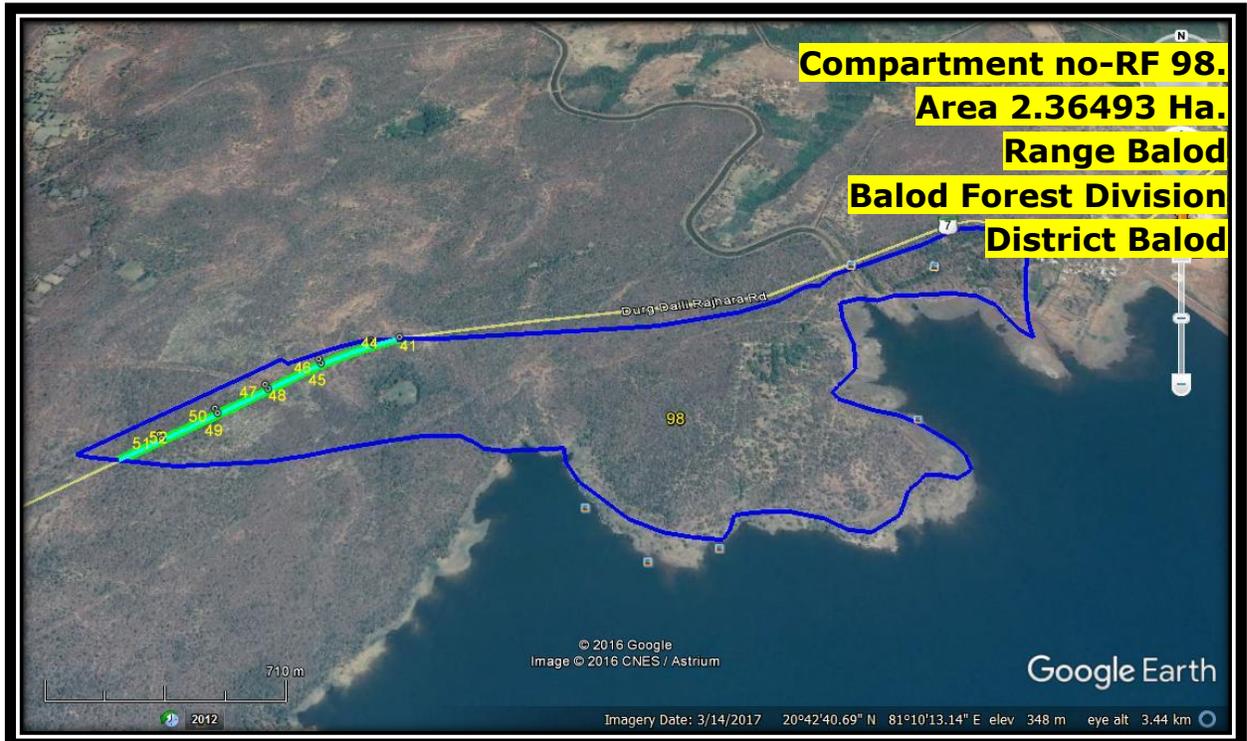
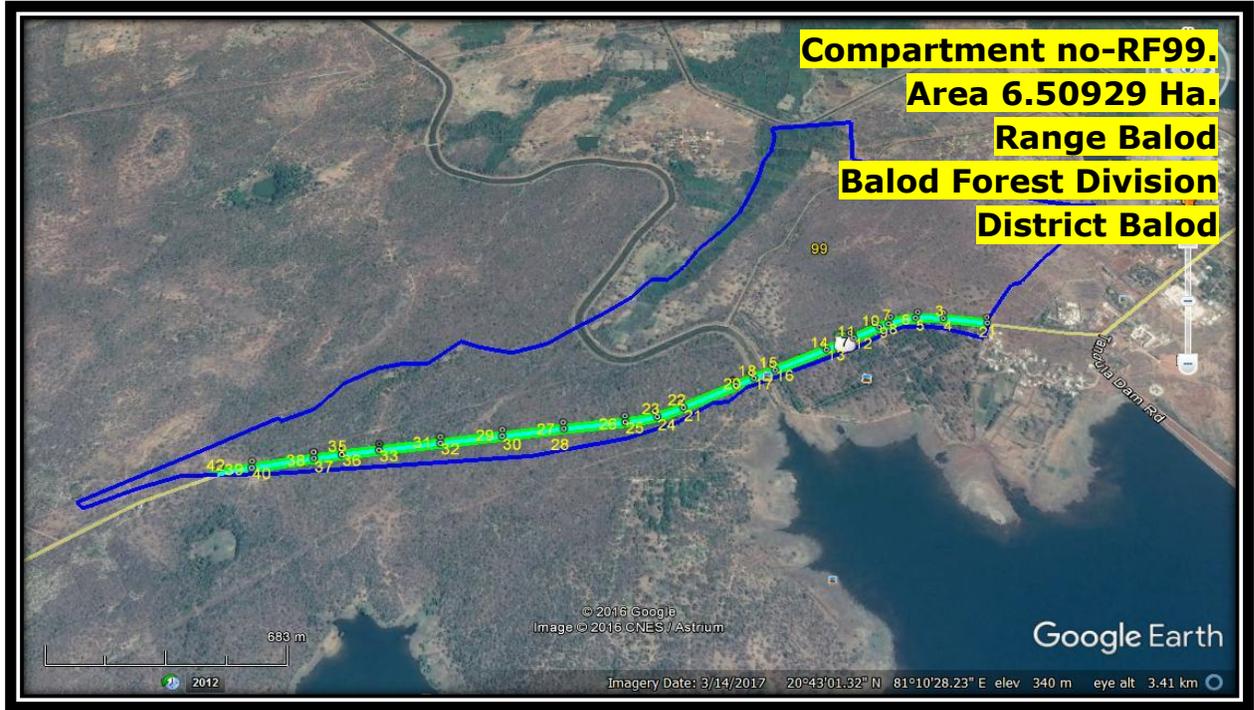


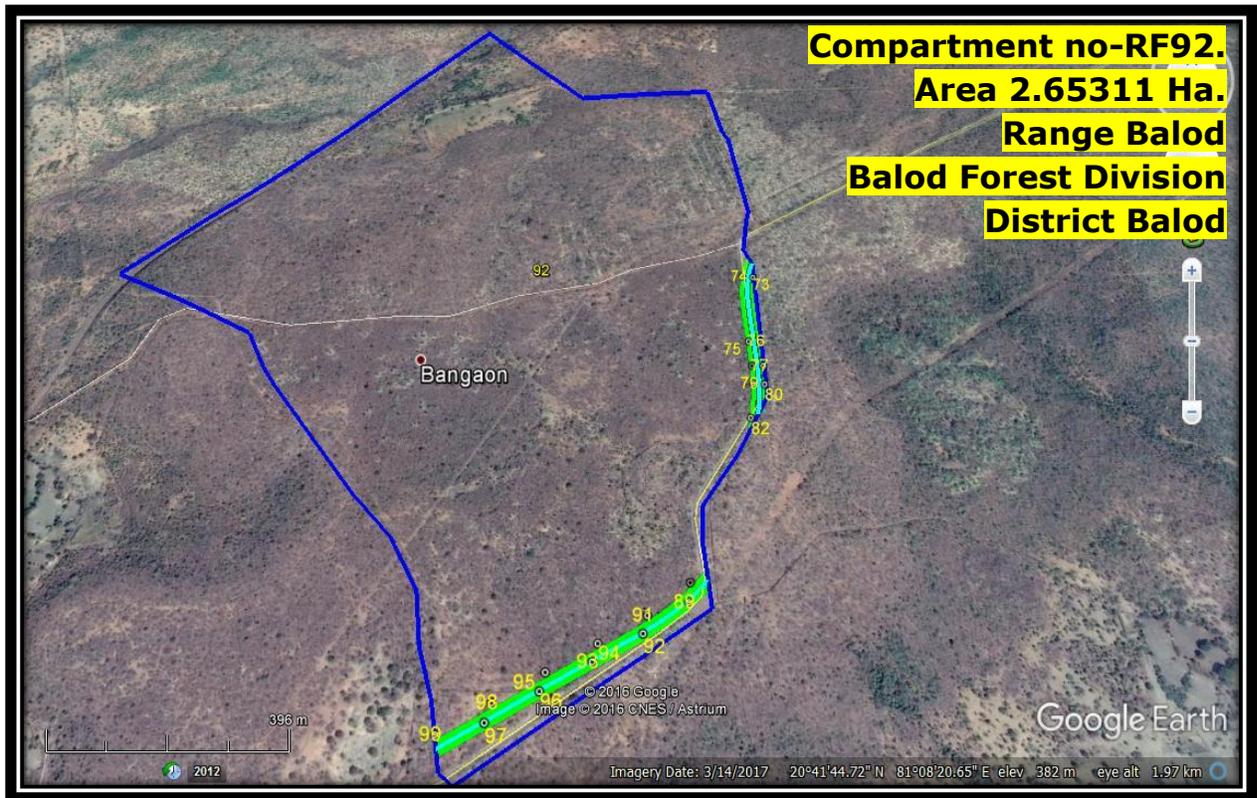
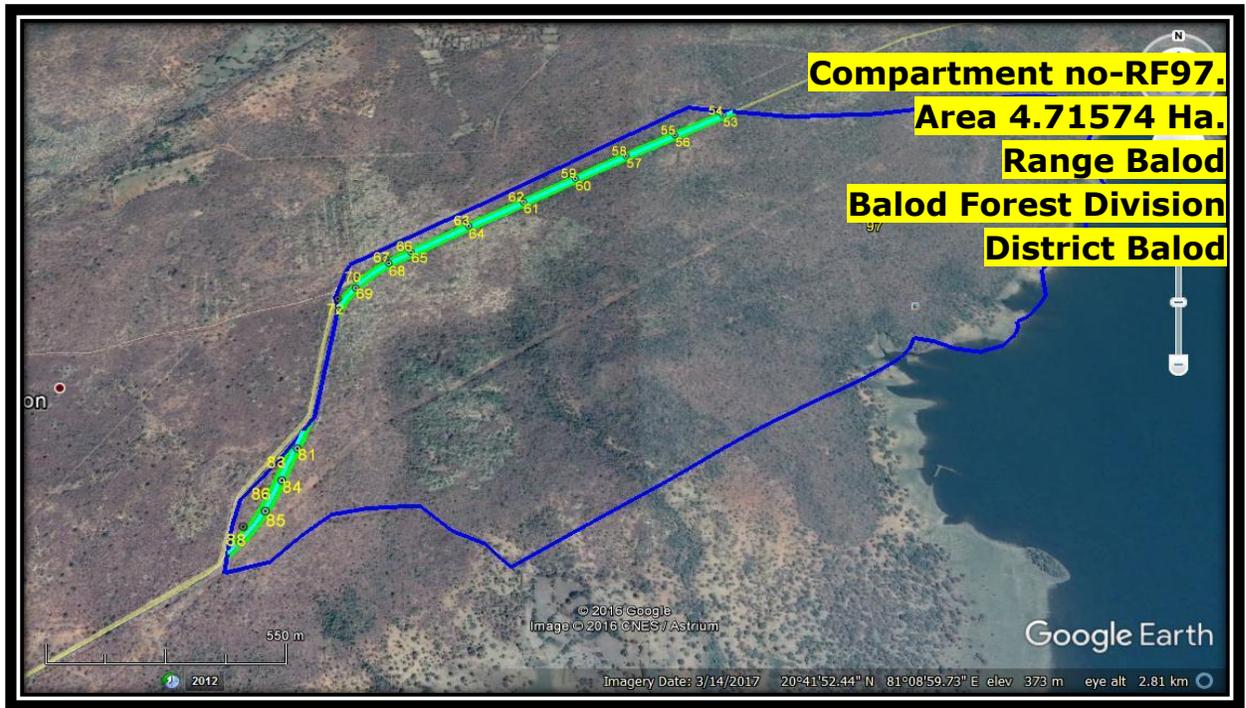

उप वन मंडलाधिकारी
उप वनमंडल दल्ली
वनमंडल बालोद (उ.म.)

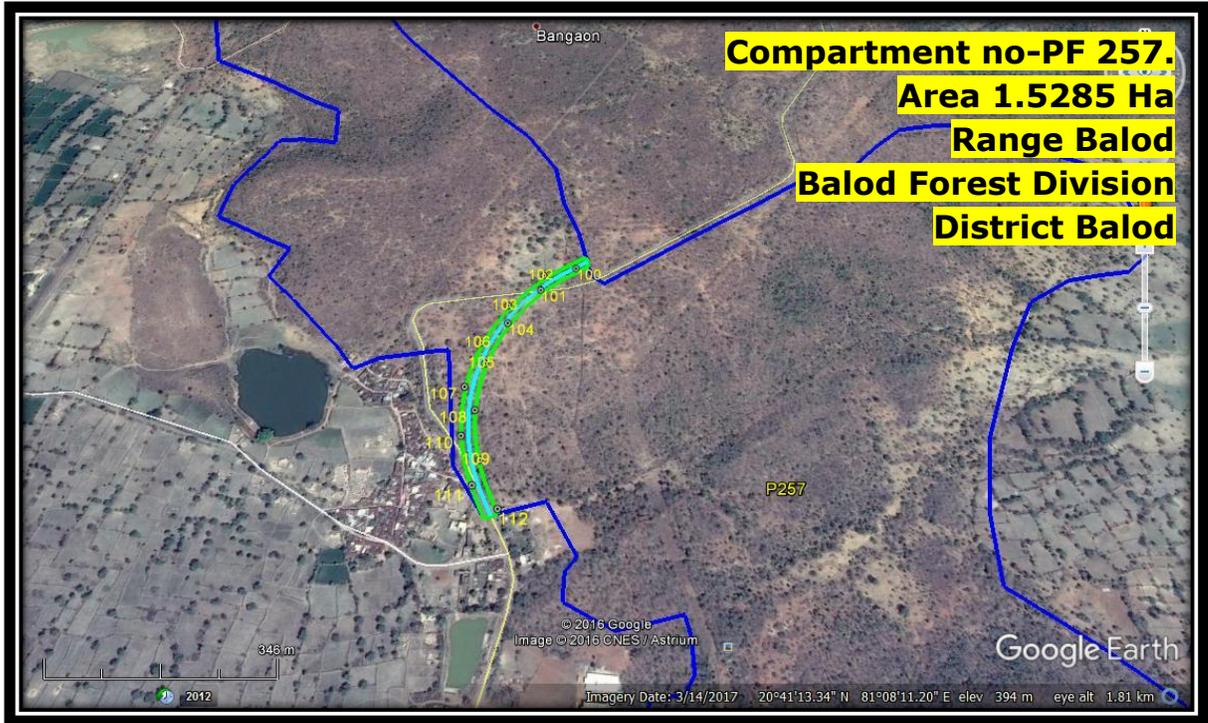

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बालोद


वन मंडलाधिकारी
बालोद वनमंडल, बालोद

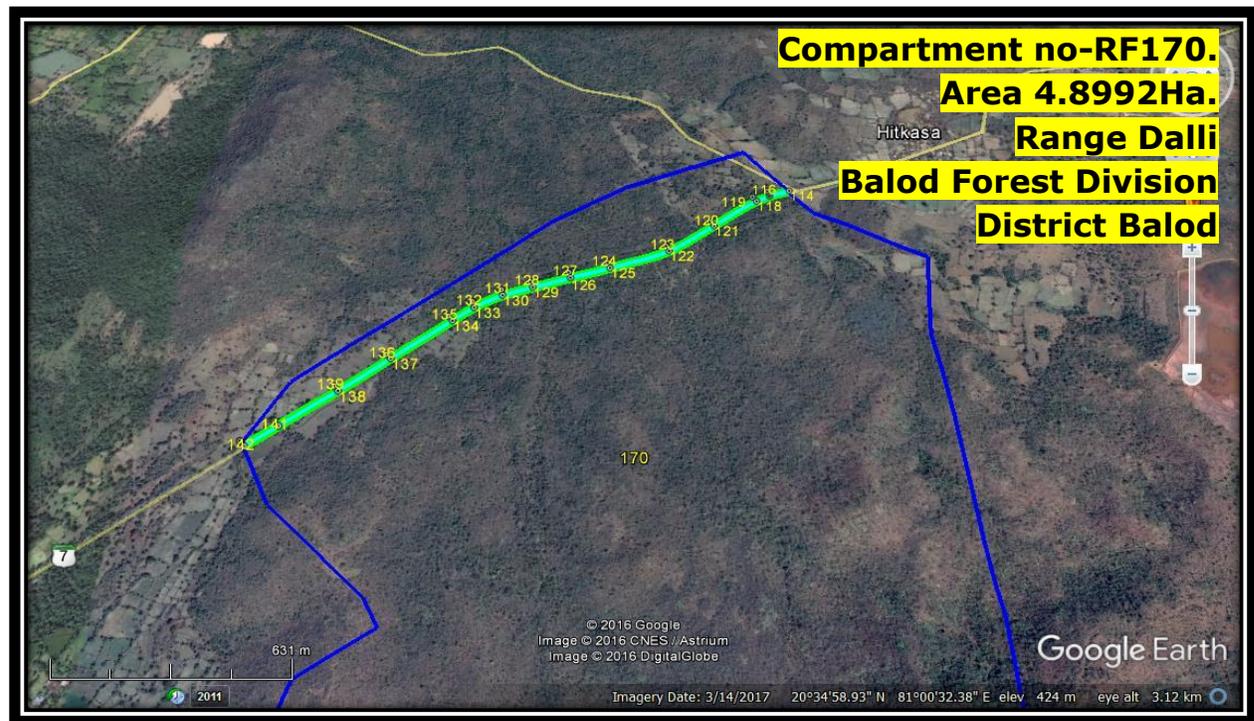
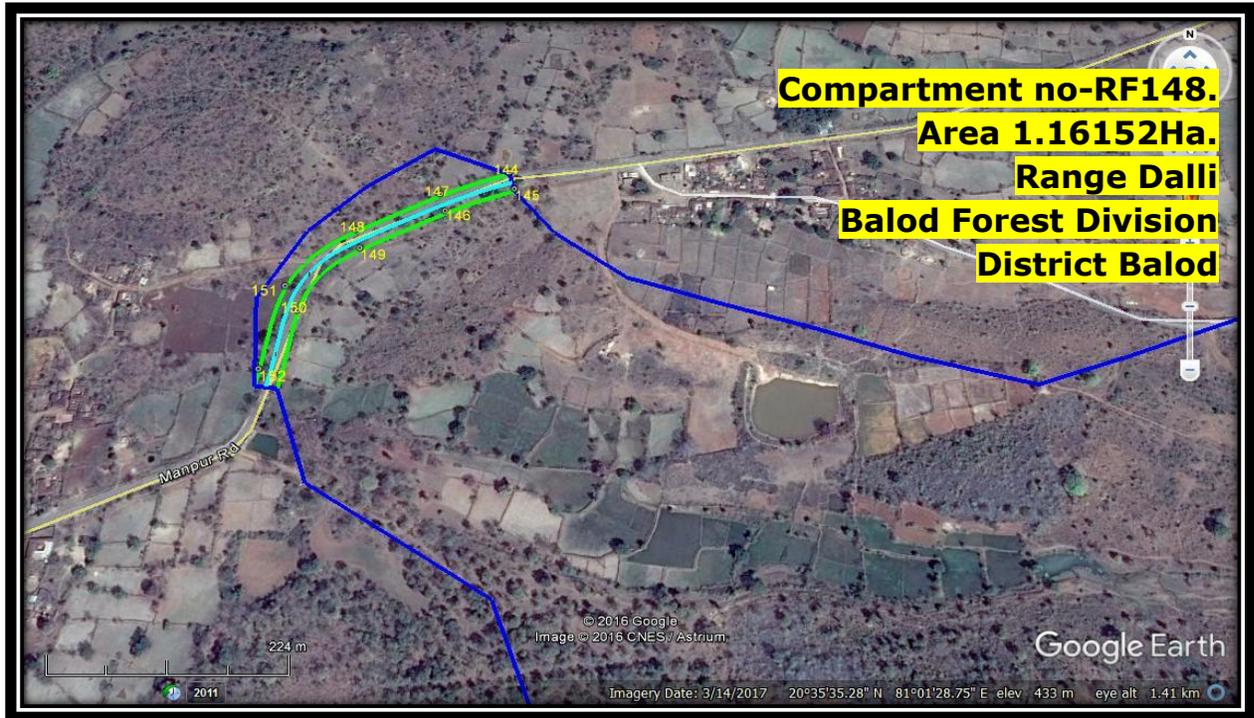
Balod Forest Division
Balod Forest Range
On Google Earth





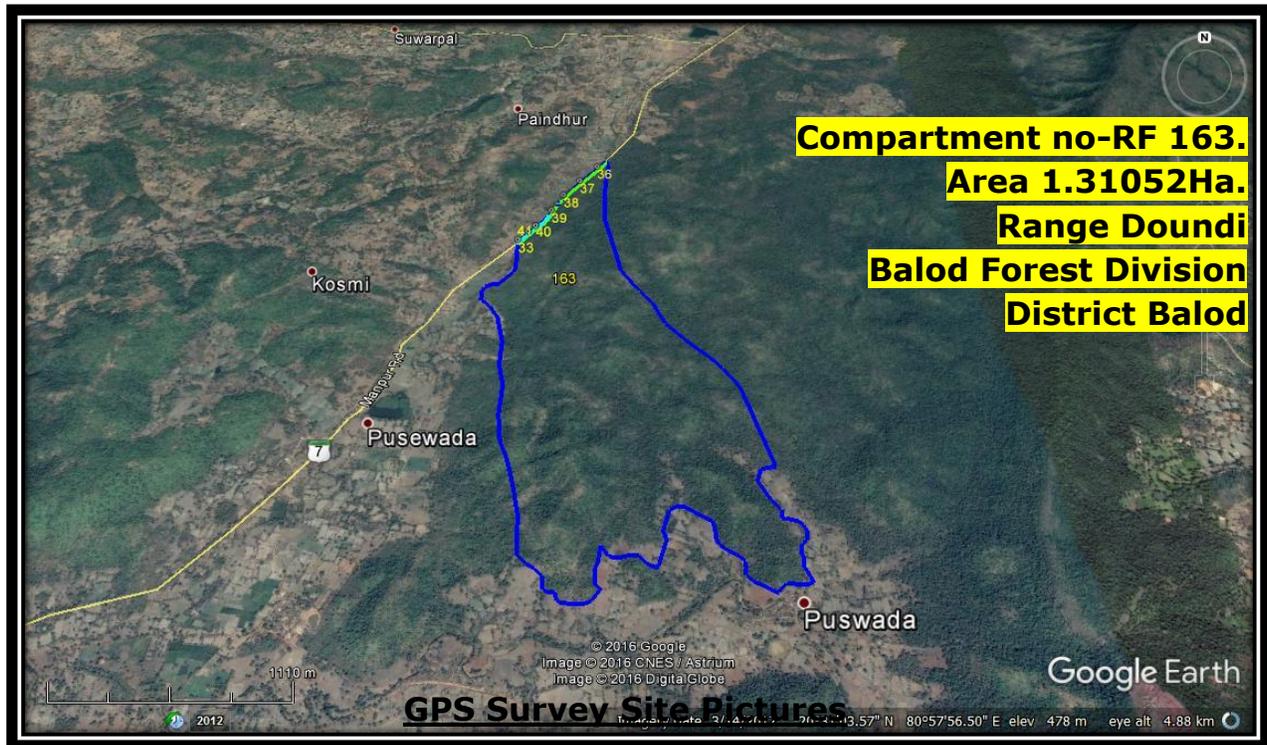
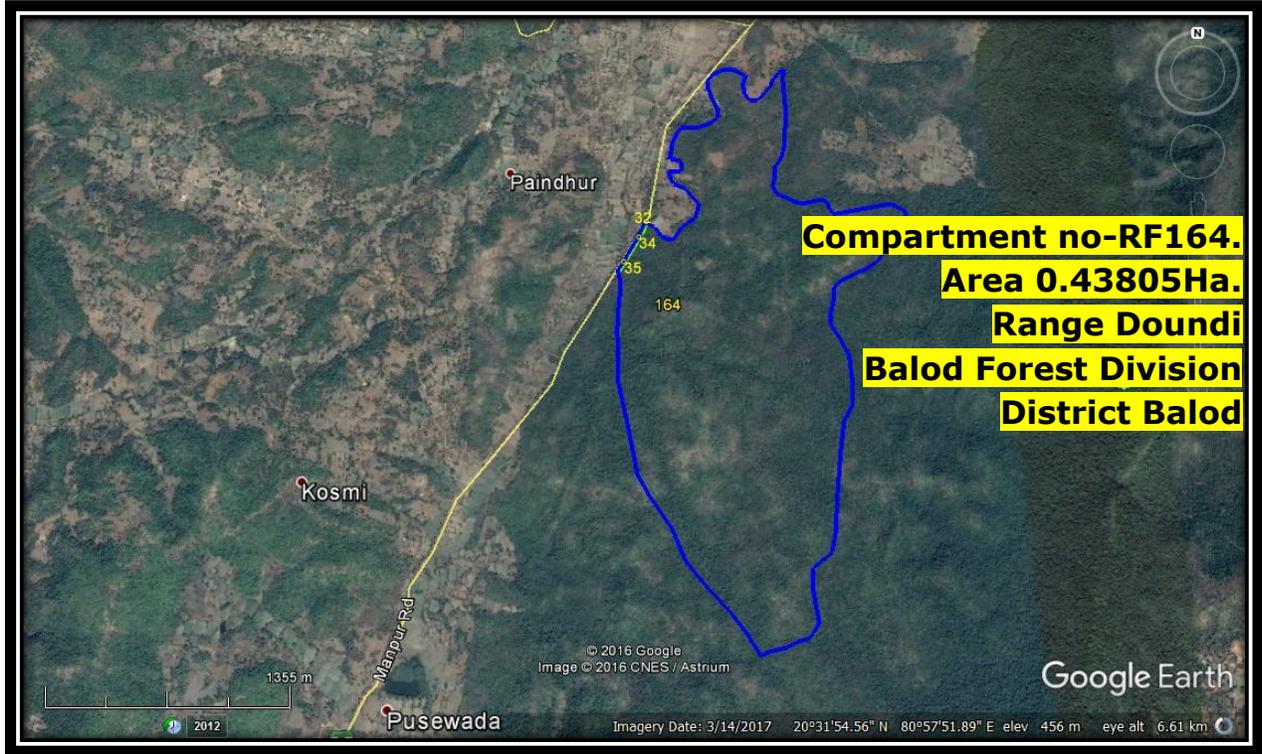


Dalli Forest Range On Google Earth



Doundi Forest Range

On Google Earth



DGPS Survey Site Pictures






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