DGPS SURVEY REPORT

OF

COMPENSATORY AFFORESTATION

FOR

FOREST LAND DIVERSION PROPOSAL OF

MEGHA-SINGPUR-DUGLI ROAD

AT

VILLAGE-AMLIDIH

TEHSIL- MAGARLOD

DIVISION-DHAMTARI

SURVEYED AREA-40.80 HACTARE

APPLICANT

OFFICE OF THE EXECUTIVE ENGINEER,
Public Works Department -Dhamtari,
District- Dhamtari, (C.G.)

PREPARED BY

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ACS

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LIST OF MAPS

1.

INTRODUCTION

Office of the Executive Engineer, Public Works Department, Dhamtari, District Dhamtari, Chhattisgarh has been submitted proposal of Megha-Singpur-Dugli Road to Forest department Govt. of Chhattisgarh for diversion of forest land for non – forestry purpose, under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 2023.

The area proposed to be compensatory afforestation over an area of **40.80** ha at village- Amlidih, under Tehsil- Magarlod, Division- Dhamtari.

As per directives of **Ministry of Environment & Forests** dated **8th July 2011**; all Applications seeking diversion of forest land for non-forest purpose under **Van (Sanrakshan Evam Samvardhan) Adhiniyam, 2023**. must be accompanied with Geo-referenced map (both soft copy and hard copy) along with shape file 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-

- Survey of India Toposheet in 1:50,000 scale indicating location of the forest land proposed to be diverted or compensate.
- Copy of the geo-referenced map of the forest/revenue land proposed to be diverted or compensate by using DGPS or Total Station.
- KML & Shape file of the geo-referenced forest/revenue land proposed to be diverted or compensate.

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2.

LOCATION & ACCESSIBILITY

The DGPS surveyed area proposed to be compensatory afforestation purpose is situated at village Amlidih, located at 7.1 Km. (aerial distance) East Direction from tehsil-Magarlod, Dhamtari (C.G.). It falls in Survey of India Toposheet no. – 64 H/13. The surveyed area is bounded by Longitudes **81° 54' 56.56319" E to 81° 55' 17.28120" E** & Latitudes **20° 45' 40.83480" N to 20° 46' 06.83399" N.** The surveyed area comes under govt land and revenue forest land, under tehsil- Magarlod, district Dhamtari. The total DGPS surveyed area proposed to be compensatory afforestation purpose is **40.80 ha**.

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3.

LAND SCHEDULE OF THE SURVEYED AREA

LAND CLASSIFICATION OF CA AREA					
DISTRICT	TEHSIL	VILLAGE	TYPE OF LAND	KHASRA NO.	DGPS SURVEYED AREA (HA.)
DHAMTARI	MAGARLOD	AMLIDIH	GOVT LAND	1649	4.40
				1651/1	6.00
				1651/3	23.00
					0.50
				1529	0.85
				1530	0.45
			REVENUE FOREST	1527	2.80
				1528	2.80
GRAND TOTAL					40.80

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4.

FEATURES & METHODOLOGY OF DGPS SURVEY

DGPS INTRODUCTION

The advanced version or the enhancement to Global positioning System or the GPS is DGPS *i.e.* Differential Global positioning System or DGPS. DGPS was developed to meet the needs of positioning and distance measuring. It provides better and improved location accuracy than GPS.

The underlying premise of differential GPS (DGPS) requires that a two DGPS receiver unit operated sequentially, one is stationary called as Base unit and other is moving called as Rover unit.

Fig. 4.1 A DGPS Base and Rover station Equipment

A GPS receiver must acquire signals from at least four satellites to reliably calculate a three-dimensional position. Ideally, these satellites should be distributed across the sky. The receiver performs mathematical calculations to establish the distance from a satellite, which in turn is used to determine its position. The GPS receiver knows where each satellite is the instant its distance is measured. This position is displayed on the data logger and saved along with any other descriptive information entered in the field software.

CONCEPT OF DGPS

A typical DGPS architecture is shown in figure below

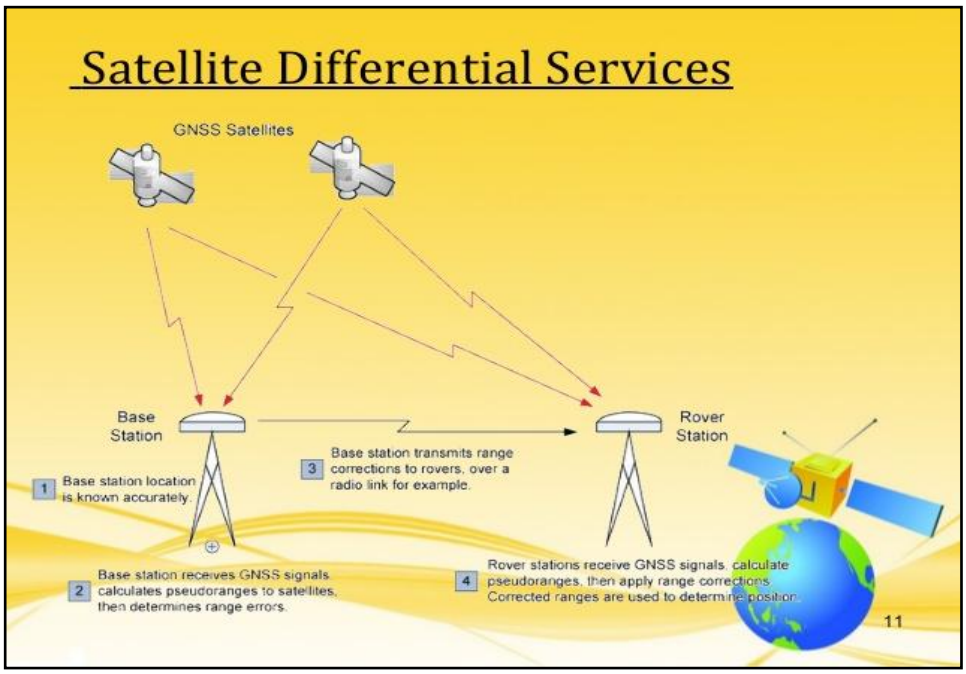

Fig. 4.2 A DGPS Base station and Rover station setup

The DGPS equipment work on GPS/GNSS satellite signal to find out exact position where they are on the global scale. The GPS Operational Constellation consists of 24 satellites that orbit the Earth in very precise orbits twice a day. GPS satellites emit continuous navigation signals. Each GPS satellite transmits data that indicates its location and the current time. All GPS satellites synchronize operations so that these repeating signals are transmitted at the same instant.

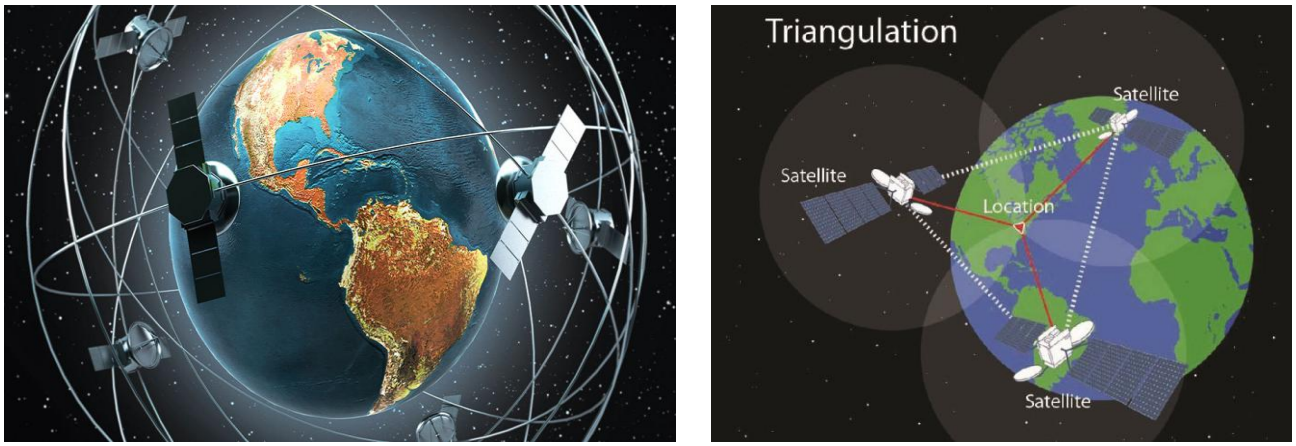

Fig. 4.3 A GPS Satellite orbit the Earth, Location acquired by Satellite system

Measurement of Travel time of the signals from a constellation of GPS Satellites orbiting the earth for enabling the position in the earth.

The GPS satellites are in orbits such that one can be able to receive signals from at least four satellites to enable for the determination of latitude, longitude, altitude and time.

Latitude and Longitude are spherical coordinates on the surface of the earth. Latitude is measured North or South of the Equator. Longitude is measured East or West of Greenwich. DGPS uses Latitudes and Longitudes to reference locations.

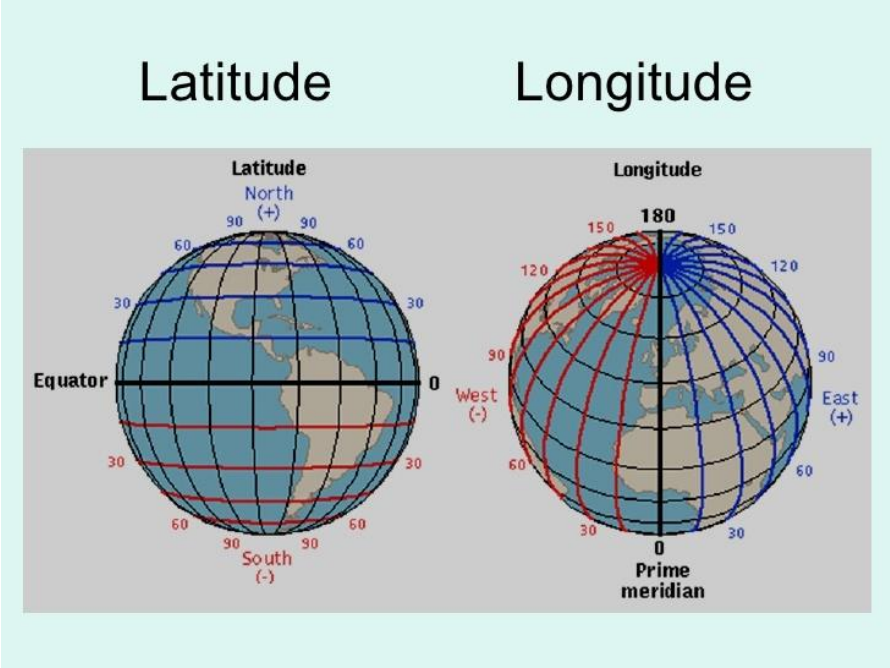

Fig. 4.4 Latitude & Longitude

Differential GPS(DGPS) is a system in which differences between observed and computed co-ordinates Tehsils (known as differential corrections) at a particular known point are transmitted to users (GPS receivers at other points) to upgrade the accuracy of the users' receivers' position.

Differential positioning user finds the point position derived from the satellite signals and applies correction to that position. These corrections, difference of the determined position and the known position are generated by a Reference Receiver, whose position is known and is fed to the instrument and are used by the second Receiver to correct its internally generated position. This is known as Differential GPS positioning.

Differential correction is a technique that greatly increases the accuracy of the collected DGPS data. It involves using a receiver at a known location - the "base

station"- and comparing that data with DGPS positions collected from unknown locations with "roving receivers.

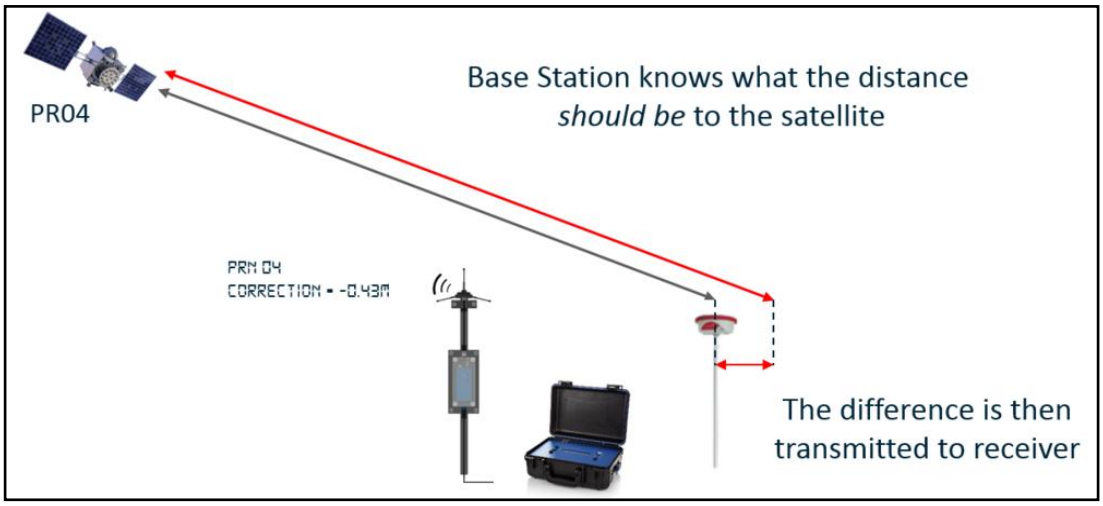

Fig. 4.5 Differential correction of error by DGPS

Differential correction can be applied in real-time directly in the field or when post processing data in the office. Although both methods are based on the same underlying principles, each accesses different data sources and achieves different levels of accuracy. Combining both methods provides flexibility during data collection and improves data integrity.

METHODOLOGY

The survey work has done with the help of ***Differential Global Positioning System survey.*** Firstly, the site visit was done and the location for base station was finalized. Then one Base station (permanent reference point) is setting up, initialization of all the parameters of BASE Unit and Initialization of the ROVER Unit in the same manner. The Base unit is collecting position data at a stationary location. Simultaneously the Rover unit moves around the field for collecting field positions.

For the calculation of lease boundary area and fixation of boundary point by coordinates lease area is mark by a several boundary point joining this boundary point by a close line it give the total area of the lease boundary, for carried survey point Rover unit is install on every boundary point and fixed after 15 minutes of reading and further move to another boundary point and repeat this process in the same manner that's how 35 boundary points covered the whole area is surveyed.

For the fixation of Base point two ground control points has been marked around the surveyed area and fixed as a survey point by Rover unit. This survey point is used as a reference for post processing for eliminating data errors and obtaining more precise readings. This point is not directly related to the surveyed area, it is only for reference.

After the successful completion of the survey, all the RAW data collected from the field by Base and Rover unit will be post processed in the GNSS software after that the post processed data is used for area calculation and fix up position of survey points. For drafting of the map firstly Cadastral map in which survey area falls is Geo-referencing using GIS software and then Superimposition of output files on Geo-referenced Vectorized cadastral maps. Finally on the basis of survey result survey report and all the standard format of maps is prepared and also a soft copy of digitize map in shape file and Kml file format is prepare. The methodological flow chart of this work is shown in fig. 4.6 next page.

Flow chart-

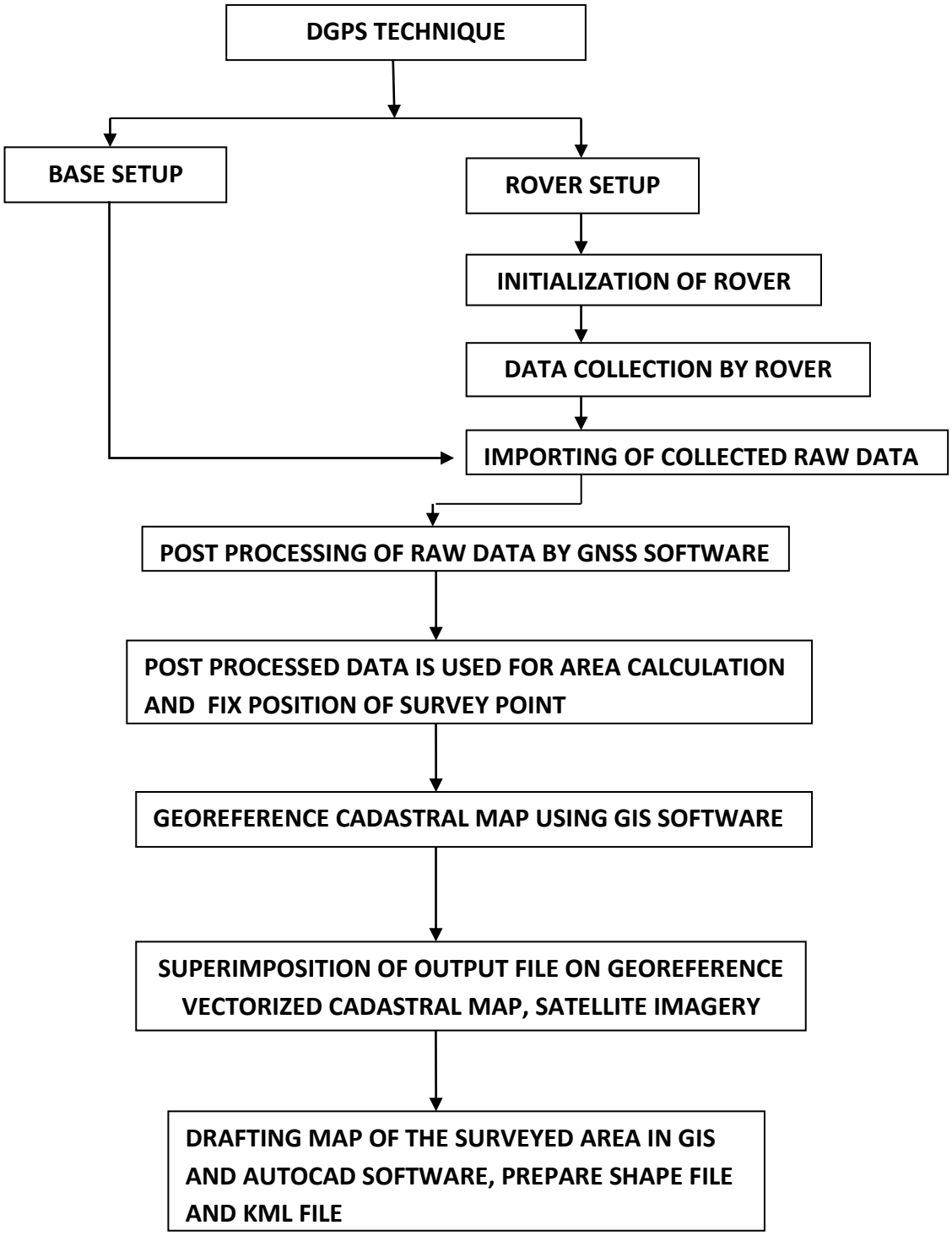

Fig. 4.6 – Flow chart of the methodology adopted

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5.

SCOPE OF WORK

We had to carry out DGPS survey and other related work for compensatory afforestation for Megha-Singpur-Dugli road project located at Village- Amlidih of Tehsil- Magarlod, District - Dhamtari, Chhattisgarh as per **Ministry of Environment and Forest, Govt. of India vide their circular no. 11-9/98-FC dated 08/07/2011** have stipulated that to ensure accurate delineation of forest area proposed to be diverted for non – forestry purposed under Section -2 of forest conservation Act 1980 the diversion proposal under forest conservation act shall be accompanied by DGPS surveyed maps of the forest land proposed for diversion.

The envisaged scopes of the assignments are described below

1. 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.
2. Processing of DGPS observation and geo-referencing of the Forest land based on DGPS Surveyed co-ordinates.
3. Generation of the shape file and kml file of the Forest land.
4. On the basis of generated coordinates survey area is marked and area is calculated.
5. Printing of Hard copy maps and report.

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SPECIFICATIONS OF EQUIPMENTS

DGPS MODEL - TOPCON CHC i70

Technical Specifications

GNSS Characteristics

- 220 channels with all in view simultaneously tracked satellite signals
  - GPS: L1C/A, L2, L2E, L5
  - GLONASS: L1C/A, L1P, L2C/A, L2P, L3
  - SBAS: WAAS, EGNOS, MSAS
  - Galileo: E1, E5A, E5B
  - BDS: B1, B2
- Advanced multipath mitigation technology
- Low noise carrier phase measurement

GNSS Accuracies (1)

- Real Time Kinematics (RTK):
  - Horizontal: 8 mm + 1 ppm RMS
  - Vertical: 15 mm + 1 ppm RMS
  - Initialization Time: Tipically < 10 s
  - Initialization Reliability: Tipically > 99.9%
- Post-processing Static:
  - Horizontal: 3 mm + 0.1 ppm RMS
  - Vertical: 5 mm + 0.4 ppm RMS
  - Baseline Length: ≤ 300 km

Hardware

- Size (H × W): 135 mm × 116 mm (5.3 in x 4.6 in)
- Weight: 1.1 kg (2.4 lb)
- Environment
  - Operating: -40°C to +85°C (-40°F to +185°F)
  - Storage: -55°C to +85°C (-67°F to +185°F)
- Humidity: 100% condensation
- Dust and Water Proof: IP67
- Shock and Vibration: 2 m (6.56 ft) fall onto concrete
- LCD: 128 x 64 dpi sunlight readable with function/accept buttons

Certifications and Calibrations

- FCC Part 15 (class B Device), FCC Part 22, 24, 90; CE Mark; C-Tick; Bluetooth EPL; IGS & NGS Antenna Calibration; MIL-STD-810G.

Communications and Data Recording

- Serial:
  - 1 x 7-pin LEMO port (external power, RS-232)
  - 1 x USB 2.0 port (USB data download, USB update)
- Network Modem: Internally integrated 3.75G modem
  - HSPA+ 21 Mbps (download), 5.76 Mbps (upload)
  - WCDMA 900/1700/1900/2100
  - EDGE/GPRS/GSM 850/900/1800/1900
- Bluetooth®: Internally integrated multimode system compatible with Android, Windows Mobile and Windows desktop operating systems
- WiFi: 802.11 b/g/n, access point mode
- UHF Radios(2): Protected TNC Female
  - Standard Internal Rx/Tx: 410 MHz to 470 MHz
    Transmit Power: 0.5 W to 2 W
    Protocol: CHC, Trimble, Pacific Crest
    Range: 5 km under optimal conditions
- Protocols:
  - CMR, CMR+, SCMRX input and output
  - RTCM 2.x, RTCM 3.x input and output
  - NMEA 0183 output
  - HCN, HRC and RINEX static formats
  - NTRIP Client, NTRIP Caster
- Data Storage:
  - 32 GB high-speed memory

Electrical

- Power Consumption: 3.8 W (depending on user settings)
- Li-ion Battery Capacity: 2 × 3400 mAh, 7.4 V
- Operating Time(3):
  - RTK UHF Base: 6 h
  - RTK Rover: 8 h to 10 h
  - Static: 12 h
- External Power: 12 V DC to 36 V DC

(1) Accuracy and reliability specifications may be affected by multipath, satellite geometry and atmospheric conditions. Performances assume minimum of 5 satellites, follow up of recommended general GPS practices. (2) UHF is an option and UHF type approvals are country specific. (3) Operating time varies based on temperature.

Specifications are subject to change without notice.

7.

CO-ORDINATES OF THE DGPS SURVEYED POINTS FOR CA LAND AT VILLAGE- AMLIDIH, DISTRICT DHAMTARI

POINT NO	Latitude	Longitude
BP01	20° 46' 17.54400" N	81° 55' 05.80439" E
BP02	20° 46' 06.83399" N	81° 54' 59.88959" E
BP03	20° 46' 05.67120" N	81° 55' 01.79759" E
BP04	20° 46' 05.97359" N	81° 55' 05.54159" E
BP05	20° 46' 06.08520" N	81° 55' 07.84200" E
BP06	20° 45' 59.88600" N	81° 55' 09.19920" E
BP07	20° 45' 58.80600" N	81° 55' 09.44760" E
BP08	20° 45' 58.78799" N	81° 55' 08.63400" E
BP09	20° 45' 58.05720" N	81° 55' 09.83280" E
BP10	20° 45' 58.43519" N	81° 55' 10.90919" E
BP11	20° 45' 56.17439" N	81° 55' 11.52479" E
BP12	20° 45' 56.34000" N	81° 55' 12.44640" E
BP13	20° 45' 49.53959" N	81° 55' 14.77919" E
BP14	20° 45' 44.63280" N	81° 55' 16.15080" E
BP15	20° 45' 40.50719" N	81° 55' 17.09039" E
BP16	20° 45' 39.59280" N	81° 55' 10.75800" E
BP17	20° 45' 39.41279" N	81° 55' 01.11720" E
BP18	20° 45' 39.99599" N	81° 55' 00.59519" E
BP19	20° 45' 40.13639" N	81° 54' 57.82679" E
BP20	20° 45' 48.46320" N	81° 54' 57.04560" E
BP21	20° 45' 54.61559" N	81° 54' 56.56319" E
BP22	20° 45' 58.31279" N	81° 55' 00.11279" E
BP23	20° 45' 57.92399" N	81° 55' 02.92440" E
BP24	20° 45' 56.86560" N	81° 55' 02.29080" E
BP25	20° 45' 55.35720" N	81° 55' 01.44839" E
BP26	20° 45' 52.13520" N	81° 55' 00.88319" E
BP27	20° 45' 48.36240" N	81° 55' 01.09560" E
BP28	20° 45' 47.55959" N	81° 55' 01.36559" E
BP29	20° 45' 44.31239" N	81° 55' 00.85080" E
BP30	20° 45' 43.75080" N	81° 55' 00.92279" E
BP31	20° 45' 59.91479" N	81° 55' 04.41119" E
BP32	20° 45' 59.93280" N	81° 55' 03.96840" E
BP33	20° 45' 58.29480" N	81° 55' 03.07920" E
BP34	20° 45' 58.80959" N	81° 54' 59.44679" E
BP35	20° 45' 59.83199" N	81° 55' 00.06959" E
BP36	20° 45' 59.99399" N	81° 55' 01.23960" E
BP37	20° 46' 02.51759" N	81° 54' 59.72399" E
BP38	20° 46' 05.35800" N	81° 55' 00.83640" E
BP39	20° 46' 05.40479" N	81° 54' 59.74200" E

BP40	20° 46' 13.13039" N	81° 54' 59.25240" E
BP41	20° 46' 13.35000" N	81° 55' 07.63680" E
BP42	20° 46' 11.37719" N	81° 55' 07.74120" E
BP43	20° 46' 09.80040" N	81° 55' 07.44599" E
BP44	20° 46' 09.31800" N	81° 55' 07.19400" E
BP45	20° 46' 08.76000" N	81° 55' 07.21920" E
BP46	20° 46' 07.14359" N	81° 55' 07.78440" E
BP47	20° 46' 06.55680" N	81° 55' 03.64079" E
BP48	20° 46' 06.52439" N	81° 55' 01.76160" E
BP49	20° 46' 09.26760" N	81° 55' 01.71839" E
BP50	20° 46' 09.24240" N	81° 55' 00.26040" E
BP51	20° 46' 13.13760" N	81° 54' 58.78440" E
BP52	20° 46' 15.34799" N	81° 54' 58.94640" E
BP53	20° 46' 17.41440" N	81° 55' 00.93000" E
BP54	20° 46' 14.26439" N	81° 55' 07.39199" E

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UTM: 44Q
595439mE 2296228mN
Elevation: 320.08±28.9 m
Accuracy: 10.6 m
Time: 01-30-2026 11:54
Note: RAJIM AMLIDIH
FOREST


47
E
N


E
N


25
E
N


29
E
N
81°55'00.92279"
20°45'43.75080"


27
E
N
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16
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