

DGPS Survey Report of the block.

**D.G.P.S. SURVEY
REPORT**

**FOR
BLOCK AREA BOUNDARY POINT FIXATION OF
NANHWARA KYMORE LIMESTONE BLOCK
VILLAGE – NANHWARA, MEHGAON, BADARI,
DEORI MAJHGAWAN, KYMORE ETC.
TEHSIL-VIJAYRAGHAVGARH
DISTRICT-KATNI
STATE-MADHYA PRADESH
DGPS SURVEYED AREA-2252 HA**




ENGEOTECH CONSULTANT'S
1338, Vijay Nagar, Jabalpur

SURVEYED BY

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ANNEXURES

<i>S. NO.</i>	<i>MAP</i>	<i>ANNEXURE</i>
1.	Google Imagery Showing Block Boundary of Nanhwara Kymore Limestone Block.	Map 1

1. INTRODUCTION & OBJECTIVE

1.1 INTRODUCTION

The DGPS Survey of Nanhwara Kymore Limestone Block boundary has been conducted from 09/04/2025 to 30/04/2025 in the presence of survey team of Engeotech Consultant, Jabalpur (M.P.).

1.2 OBJECTIVE

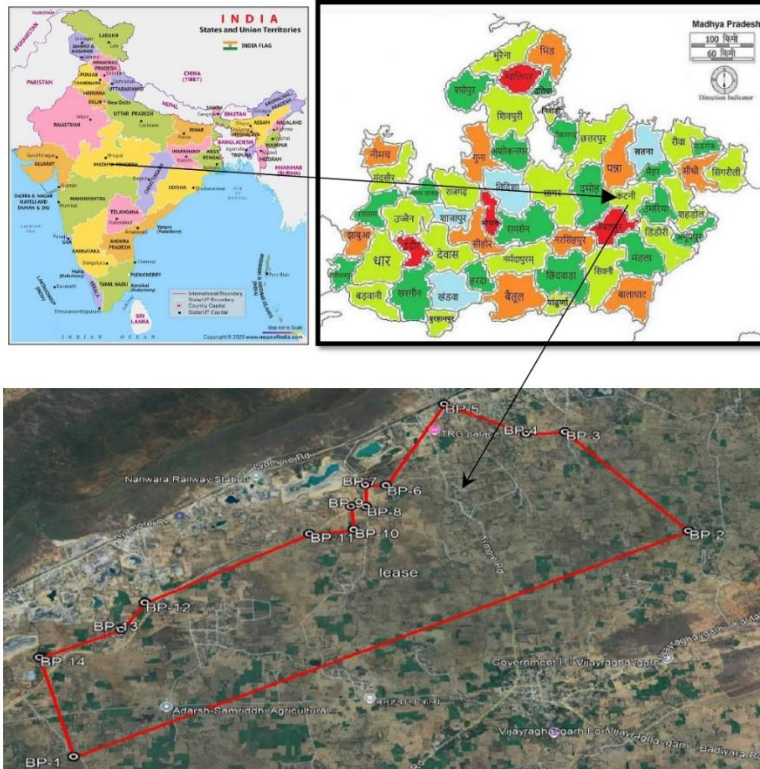
The main objective of the DGPS survey of the Block area is to fix boundary point on field area so it provides an identical coordinate point to a different particular Block area and it minimize the land disputed problems and fix an accurate area and dimension of the Block. The conventional methods of survey to delineate and demarcate the Block area which are time consuming. Further, the conventional surveys are “Unprojected” Surveys, hence linking them to geospatial domain is a challenging task. The modern survey technique using Differential Global Positioning System (DGPS) bring efficacy in survey in shorter time span compared to old method of survey and record preparation. The combination of GIS and GPS activities play a crucial role in developing the survey of the Block area boundary points and making Google maps. Area, length & other measures in the GIS numerical database are considerably easy to compute and correlate with already available data.

2. LOCATION

The DGPS Surveyed Nanhwara Kymore Limestone Block area is situated in Village Nanhwara, Mehgaon, Badari, Deori, Majhgawan, Kymore etc. Tehsil Vijayaraghavgarh District Katni (M.P.). It is located about 25 km (Aerial Distance) towards NE Direction of District Katni (M.P.). The Surveyed Area Is Bounded By -

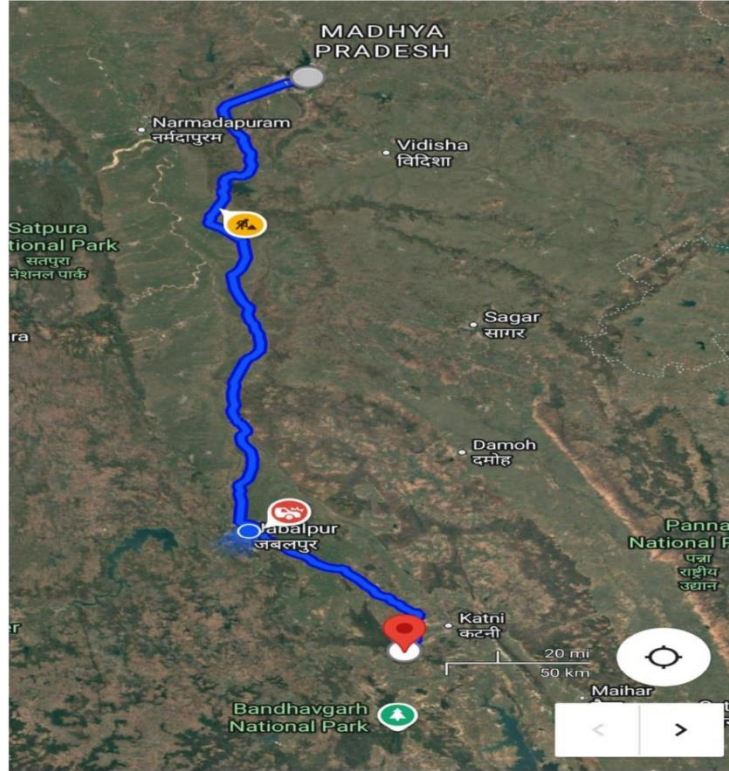
Latitudes - $23^{\circ} 59' 12.4812''\text{N}$ - $24^{\circ} 02' 52.2017''\text{N}$
Longitudes - $80^{\circ} 32' 13.5461''\text{E}$ - $80^{\circ} 37' 37.4214''\text{E}$

The Surveyed Comes Under Village Nanhwara, Mehgaon, Badari, Deori, Majhgawan, Kymore etc. Tehsil Vijayaraghavgarh, District Katni (M.P.). The Total DGPS Surveyed Area is 2252 hectares.

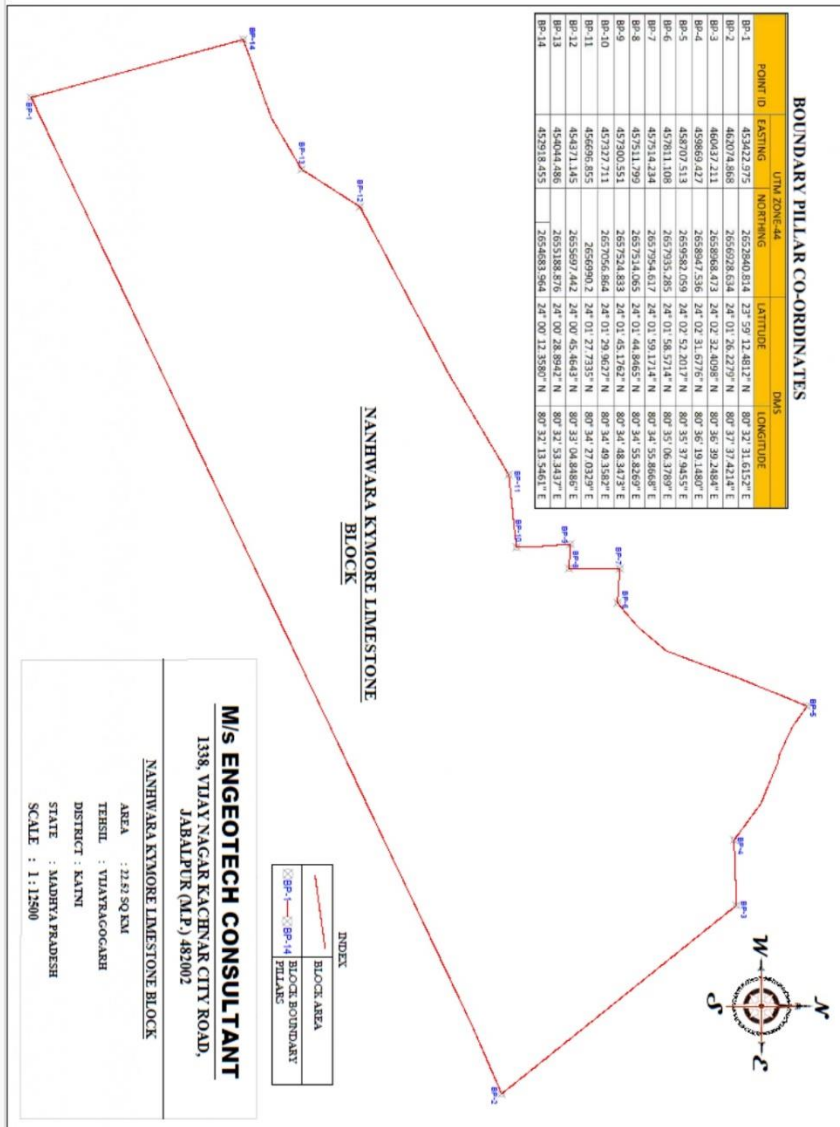


2.1. LOCATION MAP

NANHWARA IS APPROXIMATELY 418 KM. AWAY FROM STATE CAPITAL BHOPAL.



Sanctioned Area Map



1. SCOPE OF WORK

1. Establishment of One base station (Primary Control Point) - In the surveyed area.

2. Demarcation of Block boundary area by DGPS Survey:

- Carried out of survey work using DGPS Rover unit in Real Time Kinematic (RTK) mode to collect UTM Co-ordinates (WGS 84 Datum) for demarcation of precise area boundary and fixing up its ground position with pillar for construction & erection of pillar to demarcate the exact area boundary as per the norms specified for the purpose.
- Rover unit move by the survey team by walking along the Block boundary and collect a survey point on each and every turn or bend from each point of the lease boundary.

3. Erection of Pillars along the surveyed area boundary:

- Construction & Erection of pillars i.e., along the surveyed area boundary with a minimum distance of each pillar as per the norms specified for the purpose. Pillars size as per the norms specified for the purpose.
- Pillars are painted and marked by its pillar no's & its DGPS Coordinates, as per the norms specified for the purpose.

4. Preparations of land classification

- Preparation of land classification of the surveyed area showing the plot & type of land Agriculture Land.

4. FEATURES & METHODOLOGY OF DGPS SURVEY

4.1 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.

4.2 CONCEPT OF DGPS

A typical DGPS architecture is shown in figure below-

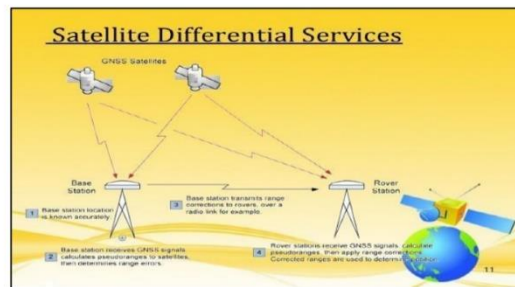


Fig. 4.2 A DGPS Base station and Rover station setup

DGPS equipment work on GPS/GNSS satellite signals 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.

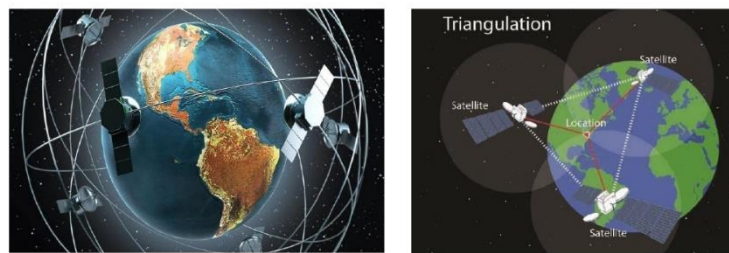


Fig. 4.3 A GPS Satellite orbit the Earth, Location acquired by Satellite system

'It is actually 'Measurement of travel time' of signals from a constellation of GPS Satellite orbiting the earth for enabling a position on 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.

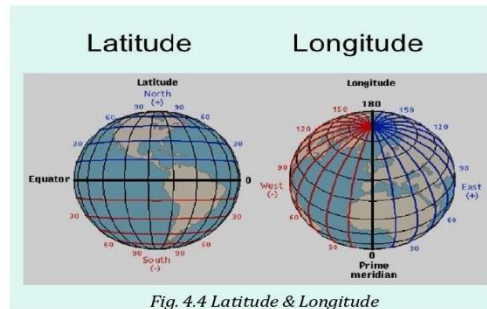


Fig. 4.4 Latitude & Longitude

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

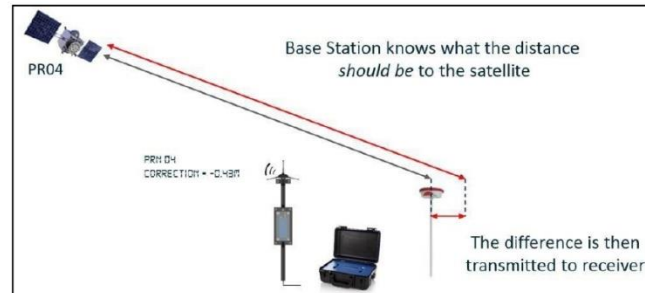


Fig. 4.5 Differential correction of error by DGPS

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 provide flexibility during data collection and improves data integrity.

5. PROCEDURE FOR SURVEY

5.1 Establishment of Primary Control Point:

Based On the Input Data and Information Provided by The DGPS Base Station (Primary Control Point) Near the Survey Area Has Planned. So, Three Base Station Established Near the Nanhwara Kymore Limestone Block area is situated in Village - Nanhwara , Mehgaon , Badari , Deori , Majhgawan , Kymore etc. Tehsil Vijayaraghavgarh District Katni (M.P.).

Co-ordinate of the Primary Control Point:

POINT NAME	LONGITUDE			LATITUDE			UTM Co-ordinates (WGS84)	
	D	M	S	D	M	S	Easting (X)	Northing (Y)
BASE1	80	33	29.02	24	00	19.24	455051.48	2654888.77
BASE2	80	36	13.39	24	01	59.69	459703.18	2657964.23
BASE3	80	34	53.31	24	01	3.27	457436.90	2656235.61

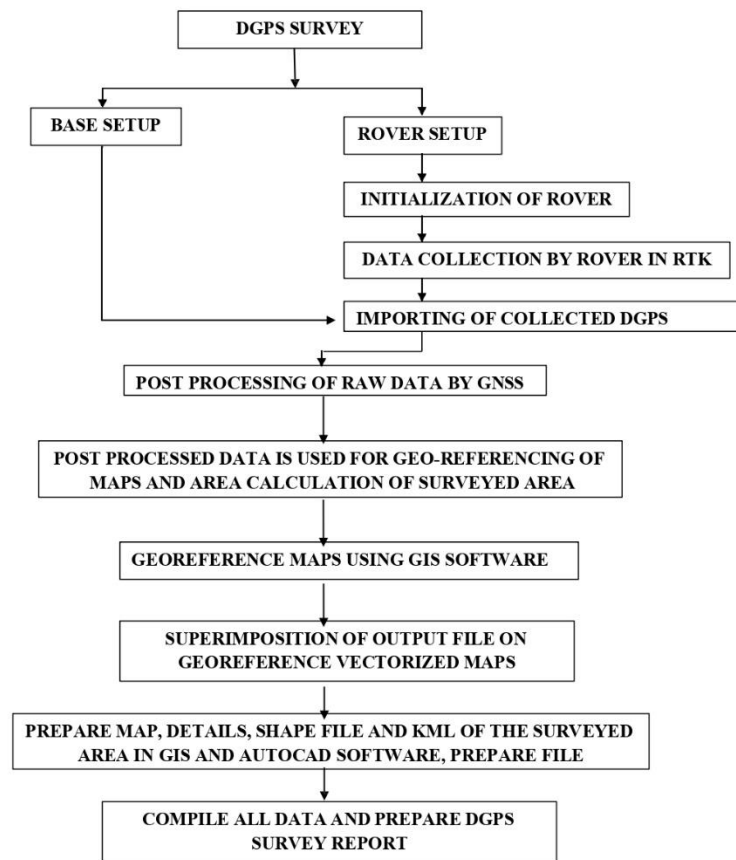
5.2 DGPS Survey of Block Boundary:

DGPS survey was carried out using a pair of DGPS instrument. One DGPS Instrument was used as Base Station and the other DGPS instrument was working as Rover. Base station fixes at a stationary position while the Rover move by the survey team by walking along the Block boundary and collect a survey point on each and every turn or bend from each point of the Block boundary. The distance between the Base Station and rover was always less than 3 km. The survey was conducted in Real Time Kinematic (RTK) mode.

5.3 Geo-referencing of Map:

Maps like Google map, GOOGLE Imagery etc. in which Mine Block area boundary falls are Geo referencing by collected minimum four or more DGPS referenced point on survey field area for geo referencing of map it is necessary that this referenced point location is also show in maps. In GIS software on the bases of this collected survey point, map is registered by input the four or more different coordinate value (WGS 84 Datum) of the survey point on definite location mark on map and after the minimize of whole error creating during geo referencing the map finally the map is geo referenced and Mine lease boundary vector in the form of shape file has been prepared.

5.4 FLOW CHART OF DGPS SURVEY PROCEDURE



6. SPECIFICATION OF DGPS EQUIPMENT

We deployed a high performance GNSS board 600 channels and capable of supporting multiple satellite constellations devices to carry out the DGPS survey. The technical specification is given below:



Leica Viva GS14 Data sheet





Easy-to-use software

The compact and powerful Leica Viva GS14 smart antenna is equipped with the intuitive SmartWork Viva software. With clear graphics, practical menu structures, understandable terminology and simplified workflow, save time and effort on any site. SmartWork Viva is incredibly easy to learn and use. You and your field crew will be up to speed in no time.



Infinitely bridging the field to the office

Leica Infinity imports and combines data from your GNSS, total station and level instruments for one final and accurate result. Processing has never been made easier when all your instruments work in tandem to produce precise and actionable information.



ACC®

Customer care only a click away.

Through Active Customer Care (ACC), a global network of experienced professionals is only a click away to expertly guide you through any problem. Eliminate delays with superior technical service. Finish jobs faster with excellent consultancy support, and avoid costly site revisits with online service to send and receive data directly from the field. Control your costs with a tailored Customer Care Package, giving you peace of mind you're covered anywhere, anytime.



- when it has to be right



Leica Viva GS14

CNSS PERFORMANCE

CNSS Technology	Leica SmartTrack	Advanced four constellation tracking
Leica SmartCheck	Continuous check of RTK solution	Reliability 99.99%
Signal tracking		GPS (L1, L2, L2C), Glonass (L1, L2), BeiDou (B1, B2), Galileo (E1, E5a), SBAS (WAS, EGNOS, MSAS, GAGAN)
Number of channels		120 (up to 60 satellites simultaneously on two frequencies)

MEASUREMENT PERFORMANCE & ACCURACY¹

Time for initialisation		Typically 4 s
Real-time kinematic	Single baseline Network RTK	Hx 8 mm + 1 ppm / V 15 mm + 1 ppm Hx 8 mm + 0.5 ppm / V 15 mm + 0.5 ppm
Post processing	Static (phase) with long observations Static and rapid static (phase)	Hx 3 mm + 0.1 ppm / V 3.5 mm + 0.4 ppm Hx 3 mm + 0.5 ppm / V 3.5 mm + 0.5 ppm
Code differential	DGPS / RTCM	Typically 25 cm

COMMUNICATIONS

Communication ports	Leica Bluetooth [®]	USB and RS232 serial Bluetooth [®] v2.0.0 + EDR, class 2
Communication protocols	RTK data protocols NMEA output Network RTK	Leica, Leica iC, OMR, OMA, RTCM 2.2, 2.3, 3.0, 3.1, 3.2 MSM NMEA 0183 V4.00 and Leica proprietary VRS, FQZ, IMAK, IMAK (RTCM SC 104)
Built-in data links	3.75 G GSM / UMTS / CDMA phone modem	Fully integrated, internal antenna Fully integrated, receive and transmit, external antenna 400 - 470 MHz, 1 W output power
External data links	Radio modem	GSM / GPRS / UMTS / CDMA and UHF / VHF modem

GENERAL

Field controller and software	Leica SmartWork Viva software	Leica CS10 and CS15 field controller
User interface	Buttons and LEDs Web server	On / Off and Function button, 7 status LEDs, Full status information and configuration options
Data recording	Storage Data type and recording rate	Removable microSD card, 8 GB Leica CS10 raw data and RINEX data at up to 20 Hz
Power management	Internal power supply External power supply Operation time ²	Exchangeable Li-ion battery (2.6 Ah / 7.4 V) Nominal 12 V DC, range 10.5 - 28 V DC 7 h recording, Rx data with internal radio, 5 h transmitting (Tx) data with internal radio, 6 h Rx/Tx data with internal modem
Weight and Dimensions	Weight Diameter x Height	0.99 kg (2.14) / 2.90 kg standard RTK rover setup on pole 100 mm x 90 mm
Environmental	Temperature Drop Proof against water, sand and dust Vibration Humidity Functional shock	-40 to 65°C operating, -40 to 80°C storage Withstands bumps over from 2 m survey pole onto hard surfaces IP68 (IEC60529 / MIL STD 883C 506.5 I) MIL STD 883C 510.5 I / MIL STD 883C 512.5 I) Withstands strong vibration (ISO9022-36-08 / MIL STD 883C 514.6 Cat.24) 100% (ISO9022-13-05 / ISO9022-12-04 / MIL STD 883C 507.5 I) 40 g / 15 to 23 msec (MIL STD 883C 516.6 I)

LEICA VIVA GS14 - GNSS SMART ANTENNA	Performance	Professional
SUPPORTED GNSS SYSTEMS		
Dual frequency	✓	✓
GPS / GLONASS / Galileo / BeiDou	✓ / • / • / •	✓ / ✓ / ✓ / ✓
RTK PERFORMANCE		
DGPS/RTCM, RTK Unlimited, Network RTK	✓	✓
POSITION UPDATE & DATA RECORDING		
5 Hz / 20 Hz positioning	✓ / ✓	✓ / ✓
Raw data / RINEX data logging	✓ / •	✓ / ✓
NMEA out	•	✓
ADDITIONAL FEATURES		
RTK reference station functionality	✓	✓
3.75G or CDMA Phone / UHF-Radio (receive & transmit) modem	✓ / •	✓ / •

✓ Standard • Optional

¹ Measurement precision, accuracy, reliability and time for initialization are dependent upon various factors including number of satellites, observation time, atmospheric conditions, multipath etc. Figures quoted assume normal to favourable conditions. A full Galileo and Galileo constellation will further increase measurement performance and accuracy.

² Might vary with temperature, age of battery, transmit power of data link device.

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- when it has to be right

Leica
Geosystems

7.OUTPUT

After DGPS Survey of Nanhwara Kymore Limestone Block area boundary the total land area demarcated as 2252 hectares.

7.1 DGPS SURVEYED BOUNDARY CO-ORDINATES OF BLOCK AREA –

POINT ID	UTM ZONE-44		DMS	
	EASTING	NORTHING	LATITUDE	LONGITUDE
BP-1	453422.975	2652840.814	23° 59' 12.4812" N	80° 32' 31.6152" E
BP-2	462074.868	2656928.634	24° 01' 26.2279" N	80° 37' 37.4214" E
BP-3	460437.211	2658968.473	24° 02' 32.4098" N	80° 36' 39.2484" E
BP-4	459869.427	2658947.536	24° 02' 31.6776" N	80° 36' 19.1480" E
BP-5	458707.513	2659582.059	24° 02' 52.2017" N	80° 35' 37.9455" E
BP-6	457811.108	2657935.285	24° 01' 58.5714" N	80° 35' 06.3789" E
BP-7	457514.234	2657954.617	24° 01' 59.1714" N	80° 34' 55.8668" E
BP-8	457511.799	2657514.065	24° 01' 44.8465" N	80° 34' 55.8269" E
BP-9	457300.551	2657524.833	24° 01' 45.1762" N	80° 34' 48.3473" E
BP-10	457327.711	2657056.864	24° 01' 29.9627" N	80° 34' 49.3582" E
BP-11	456696.855	2656990.2	24° 01' 27.7335" N	80° 34' 27.0329" E
BP-12	454371.145	2655697.442	24° 00' 45.4643" N	80° 33' 04.8486" E
BP-13	454044.486	2655188.876	24° 00' 28.8942" N	80° 32' 53.3437" E
BP-14	452918.455	2654683.964	24° 00' 12.3580" N	80° 32' 13.5461" E

Note: See above table highlighted row, which are major corner points of Block boundary.

8 PHOTOGRAPHS OF DGPS SURVEY WORK



8. EMPANELMENT LETTER OF STATE GOVERNMENT

संचालनालय
भौमिकी तथा खनिकर्म, मध्यप्रदेश
29 ए, खनिज भवन, अरैरा हिल्स, भोपाल
फोन एवं फेक्स-फेक्स-0755-2551795
Email- dirgeomn@nic.in

//आदेश//

क्रमांक- 2034/1279356/2023/12/1 - प्रदेश में स्वीकृत खनि रियायतों एवं नवीन खनिजधारी क्षेत्रों का डी.जी.पी.एस. तथा टोटल स्टेशन सर्वे कार्य को करने हेतु, एतद्वारा निम्नानुसार एजेंसीयों को सूचीबद्ध किया जाता है। 11/9/23

No	Agency	Address
1	Apex Mintech Consultants	3, Dhebar Colony, Near ITI Pratap Nagar, Udaipur, Rajasthan, PIN-313001
2	Engeomin Consultant	1254, Vivekanand Ward, Daya Nagar, Jabalpur (MP)
3	Engeotech Consultant	1338, First Floor, Vijay Nagar, Jabalpur Madhya Pradesh, PIN-482002
4	GSME Enterprise	E-7, House No.-G835, Shivshakti Apartment, Near Basant Kunj, Bhopal (462016)
5	MNEC Consultants	314, Kasturi Bag, Near Water Tank, Ujjain, MP
6	R.R. Construction	H.No.-109, Shivlok Greens, Gopal Nagar, Khajurikalan Road, Near SOS Balgram, District-Bhopal (MP) 462022
7	Rising Survey & Construction	231, Behind Christ Memorial School, Jain Nagar, Lalghati, Bhopal (MP) 462030
8	Soham Ferro Magnese pvt Ltd	Block No.-16-17, Ground Floor, N.K.Y. Tower, Ajani Square, Wardha Road, Nagpur-440015, Maharashtra
9	Sanskriti Infra	Near, Shiv Vihar Colony, Dev Nagar, Mahadev Ghat Road, Raipur, CG
10	Clean tech venture AES pvt Ltd	MIG-9, Manisha Market, Second Floor, A-Sector, Shahpura, Bhopal (M.P.)-462016
11	Civitech Engineers Svices	A-303, Bhau Saheb, Potness Enclave Phase-L, Gwalior (MP) 474006
12	JP Construction	314, Kasturi Bag, Near Water, Tank Ujjain, MP
13	Paliya Consultancy Services	G2, Chinav Apartment, Near Lovely Dairy, Harishankar Puram, Gwalior

उपरोक्त कार्य हेतु शर्त निम्नानुसार होगी:-

- उक्त आदेश जारी दिनांक से 05 वर्ष की अवधि के लिए मान्य होगा।
- डी.जी.पी.एस. तथा टोटल स्टेशन सर्वे कार्य हेतु पारिश्रमिक का निर्धारण अधिमान्यता प्राप्त संस्था एवं खनि रियायतधारी के मध्य आपसी समन्वय से किया जावेगा। किसी भी प्रकार का आपसी विवाद होने पर राज्य शासन उत्तरदायी नहीं होगा।

निरंतर 2....

3. कार्य की गुणवत्ता में कमी पाये जाने पर या किसी भी प्रकार की कार्य संबंधी शिकायत पाये जाने पर जांच उपरांत राज्य शासन को यह अधिकार होगा कि उक्त एजेंसी की मान्यता किसी भी समय समाप्त की जा सकती है।
4. डी.जी.पी.एस. तथा टोटल स्टेशन सर्वे कार्य के संबंध में भारत सरकार/राज्य शासन द्वारा पूर्व में तथा समय-समय पर जारी निर्देशों का पालन अधिमान्यता प्राप्त संस्थान को करना होगा।
5. उपरोक्त संस्थायें विभाग द्वारा जारी आर.एफ.पी. दिनांक 18.11.2022 में उल्लेखित शर्तों तथा निर्बंधनों के अधीन कार्य निष्पादन करने हेतु बाध्य होगी।
6. संस्थाओं द्वारा उपरोक्त शर्तों के अतिरिक्त नियमानुसार पूर्व में तथा समय समय पर जारी अन्य आवश्यक शर्तों का पालन भी सुनिश्चित करना होगा।


संचालक

प्रतिलिपी:-

1. प्रमुख सचिव, खनिज साधन विभाग, मंत्रालय, भोपाल की ओर सूचनार्थ ।
2. कलेक्टर (खनि शाखा) जिला -समस्त, की ओर सूचनार्थ ।
3. क्षेत्रीय प्रमुख (समस्त) की ओर और सूचनार्थ ।


संचालक