

:: कार्यालय वनमंडलाधिकारी, सामान्य वनमंडल महासमुन्द (छ.ग.) ::

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क्रमांक / मा.चि. / 3806
प्रति,

महासमुन्द दिनांक 18/7/2023

उप निदेशक,
इन्द्रावती टाईगर रिजर्व, बीजापुर

- विषय :- भारत सरकार की महत्वपूर्ण योजना भारतनेट परियोजना फेस – 2 के सफल क्रियान्वयन हेतु अभयारण्य/वन्यप्राणी वन क्षेत्र के व्यपवर्तन प्रस्तावों में क्षतिपूर्ति वनीकरण (CA) हेतु ग्राम बरोडा बाजार एवं भलेसर, तहसील- महासमुन्द, जिला- महासमुन्द में चिन्हांकित राजस्व भूमि 16.552 हे. को छत्तीसगढ़ इन्फोटेक प्रमोशन सोसाइटी (चिप्स), रायपुर, छत्तीसगढ़ की उपयोग पर देने बाबत।
- संदर्भ :- संयुक्त मुख्य कार्यपालन अधिकारी छ.ग. इन्फोटेक प्रमोशन सोसाइटी (चिप्स), रायपुर, छत्तीसगढ़ का पत्र क्रमांक/707/समुकाअ/चिप्स/2023 दिनांक 04.07.2023

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विषयांतर्गत संदर्भित पत्र के तारतम्य में लेख है कि भारत सरकार की महत्वपूर्ण योजना भारतनेट प्रोजेक्ट फेस –2 के सफल क्रियान्वयन हेतु छत्तीसगढ़ इन्फोटेक प्रमोशन सोसाइटी (चिप्स) रायपुर छत्तीसगढ़ द्वारा छत्तीसगढ़ राज्य में ग्राम पंचायतों को ब्लाक मुख्यालय से जोड़ने वाले मार्गों के मौजूदा राईट-ऑफ-वे के अन्तर्गत भूमिगत ऑप्टिकल फायबर केबल बिछाने हेतु वन संरक्षण अधिनियम 1980 के तहत इन्द्रावती टाईगर रिजर्व, बीजापुर वनमंडल रकबा 5.880, वन क्षेत्र के व्यपवर्तन प्रस्तावों के एवज में क्षतिपूर्ति वनीकरण (CA) हेतु ग्राम बरोडा बाजार, तहसील महासमुन्द, जिला-महासमुन्द क्षेत्रान्तर्गत राजस्व भूमि रकबा 5.880 हे. का चिन्हांकन किया गया है।

उक्त राजस्व क्षेत्र में डी.जी.पी.एस. सर्वेक्षण कार्य उपरांत डी.जी.पी.एस. सर्वेक्षण की सत्यापित प्रति एवं 06 वर्षीय Accredited वैकल्पिक वृक्षारोपण का प्रस्ताव तैयार कर आपकी ओर आवश्यक कार्यवाही हेतु संलग्न कर सम्प्रेषित है।

संलग्न :- उपरोक्तानुसार

वनमंडलाधिकारी,

सामान्य वनमंडल, महासमुन्द
महासमुन्द, दिनांक 18/7/2023

पृ. क्रमांक / मा.चि. / 3807
प्रतिलिपि :-

1. अपर प्रधान मुख्य वन संरक्षक (भू-प्रबंध/व.स.अ.) छत्तीसगढ़ नवा रायपुर की ओर सूचनार्थ सादर सम्प्रेषित।
2. संयुक्त मुख्य कार्यपालन अधिकारी छ.ग. इन्फोटेक प्रमोशन सोसायटी (चिप्स) स्टेट डाटा सेन्टर भवन, सिविल लाईन्स रायपुर, छत्तीसगढ़ की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु सम्प्रेषित।

वनमंडलाधिकारी

सामान्य वनमंडल, महासमुन्द

CHHATTISGARH BHARATNET PHASE-II PROJECT

DGPS survey Report of
COMPANSATORY AFFORESTATION PLANTATION
in East Mahasamund Forest Division over
an area of 5.880 Ha.
For DIVERSION OF PROPOSED OFC ROUTES
In ,CHHATTISGARH STATE
BHARATNET PROJECT PHASE-2

Forest Division : Mahasamund
Village (Baraunda Bazar) : 5.880 Ha.
Range : Mahasamund
District : Mahasamund (C.G.)

Applicant -



**Chhattisgarh Infotech Promotion Society (CHiPS)
Raipur (Chhattisgarh)**

Submitted By –



TATA PROJECTS

Tata Projects Limited, Raipur (Chhattisgarh)



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1. Introduction and Background

1.1. Background

The Government of Chhattisgarh intends to setup an Optical Fibre Cable Network from the Block Head Quarters to Gram Panchayats to provide high speed broadband connectivity by connecting the 85 Blocks, 5987 Gram Panchayats across the State. The proposed network architecture for BharatNet Phase-II project follows ring architecture with Internet Protocol – Multi Protocol Label Switching (IP-MPLS) technology. The network shall be leveraged to deliver scalable bandwidth to households, institutions and enterprises. It is planned to have an IP-MPLS ring at GP level with provisioning of 6 dedicated core of fibre as mandated by Government of India.

The Chhattisgarh Infotech Promotion Society (CHIPS), a Registered Society promoted by the Government of Chhattisgarh, is the nodal agency and prime mover for propelling IT growth and implementation of IT plans in the State.

The Chhattisgarh Infotech Promotion Society (CHIPS) has selected an implementation partner “**Tata Project Limited**” for BharatNet Phase-II Project. The project has been conceived with the ambitious vision of providing connectivity to the yet unreached blocks in Chhattisgarh and entails massive investment on the infrastructure creation across the state which would serve as the information highway for decades to come.

Under the Forest Conservation Act 1980 for laying underground optical fiber cables, DGPS survey has been proposed for compensatory afforestation in the diversion proposal of the following sanctuary/wildlife forest area.

SI	District	Division	Registration No/SW No	Area Ha
1	Bijapur	Indravati Tiger Reserve, Bijapur Division	FP/CG/OFC/45471/2020	5.880

1.2. Objectives

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 LiDAR/Differential GPS (DGPS) and the same should be uploaded to MoEF website along with the online application.

To meet this requirement, **Tata Project Limited** entrusted the DGPS survey work to **RK Engineering and Consultants**.

RK Engineering and Consultants is a Professional Land Mapping and Services provider across India established in the year 2016. During the last 5+ years, we had an opportunity to execute a variety of surveying jobs all over India various customer specifications for RIS, LIS, and Municipal GIS oriented jobs. Cadastral Surveys using ETS/DGPS and Provision of Ground control conforming to stringent accuracy standards using high end instruments as RTK/GPRS DGPS is our specialty. We also have a UAV (Drone).

Our range of services is inclusive of Control surveys, Boundary surveys, Topographic Land surveys, setting out surveys, Route Surveys, Volume calculations. There is a great demand for these in varied kinds of project planning and management requirements in the field of civil and structural engineering. Our services are renowned for being prompt, relevant, effective and accurate. In our field operations, we use cutting edge technologies, and all of the latest office processing and CADsoftware.

It is our goal to produce high quality and accurate land surveys, while practicing professional ethics and best practices exceeding those found in the industry. Our client base includes civil engineers, architects, land developers, attorneys, commercial, residential and private property owners.

Our expertise and dedication to client service, timely completion of the projects, getting the job done right, and doing business ethically and professionally has earned RK Engineers and Consultants many reputed clients.

OUR TEAM

We have a strong team of dedicated professionals who work in tandem with the industry trends and try to align them with the requirements of our customers. We owe our success to them and ensure that they undergo regular training programs to keep themselves abreast with the latest technological advancements.

Our team of Engineer, Supervisor, Draft Man, Technicians and Marketing Executives has in-depth knowledge which helps them in understanding the specific needs of the clients and strives to offer these services in a manner desired by them. Our competent experts have industry experience of many years and possess thorough knowledge of their respective domains.

OUR INFRASTRUCTURE

We have equipped state of the art facilities which ensure timely execution of services. The skilled personnel with us ensure that the quality standards are taken care of and there is no scope for any kind of damage to the in transit. We are backed by modern infrastructure facilities spread along with 1500 sq. feet office space. Our organization is equipped with latest surveys and survey instruments to carry out the surveys with utmost accuracy within the committed time frame. We also have a large fleet of vehicles that allow us to conduct the survey job efficiently and accurately. Our clients are regularly updated about the progress of the work, thereby, helping them to appraise the pace & progress of the work undertaken.

Backed by modern infrastructure facilities, we have installed CAD support system that allows us to deliver customized solutions as demanded by our customers. Further, we have technical and computerized facilities which also enable us to execute various high-profile projects at a fast pace and within allotted time frames. The use of sophisticated and technically advanced equipment also assists us to conduct the survey job efficiently and with great care. We are empaneled with the state department for DGPS survey allied work in Chhattisgarh.

**छत्तीसगढ़ शासन
खनिज साधन विभाग
मंत्रालय**

महानदी भवन, नवा रायपुर अटल नगर-492002

// अधिसूचना //

अटल नगर, दिनांक

25 NOV 2022

नवम्बर, 2022

क्रमांक एफ 7-14/2013/12 :: राज्य शासन एतद् द्वारा चीफ कन्ट्रोलर ऑफ माइन्स, भारतीय खान ब्यूरो, नागपुर के परिपत्र क्रमांक 2/2010, दिनांक 06.04.2010 के पैरा-2 के बिन्दु क्रमांक-2 एवं पत्र दिनांक 21.09.2011 तथा भारत सरकार के राजपत्र दिनांक 08.10.2014 एवं खनिज(परमाणु और हाइड्रोकार्बन ऊर्जा खनिजों से भिन्न) रियायत नियम, 2016 के नियम, 12 के अनुपालन में Differential Global Positioning System(डीजीपीएस) का उपयोग करते हुए खनिज कोयला को छोड़कर समस्त खनिजों के खनिज रियायतों के सीमाओं में Pricise Boundary Pillar की स्थापना कर सर्वेक्षण करने के लिए नीचे तालिका में दर्शित संस्थानों को अधिमाम्यता प्रदान करता है :-

क्र०	आवेदक एजेंसी का नाम एवं पता	रिमांक
01	02	03
01	छत्तीसगढ़ स्वामी विवेकानंद तकनीकी विश्वविद्यालय, भिलाई, पोस्ट नेवई, जिला दुर्ग-491107(छत्तीसगढ़)	खनिज कोयला को छोड़कर राज्य में समस्त खनिजों की खनिज रियायतों से डीजीपीएस सर्वे कार्य हेतु
02	मे0आर0के0इजीनियर्स एण्ड कंसल्टेंट्स, हाऊस नंबर 43, वार्ड नंबर-13 आर्य नगर, दुर्ग-491107 (छत्तीसगढ़)	
03	मे0अवि कंसल्टेंट सर्विसेस, ओसीएम चौक, बैरन बाजार, एक्सीस बैंक के सामने, रायपुर-492001 (छत्तीसगढ़)	

- 2/ अधिमाम्यता प्राप्त संस्थानों के लिए निम्नानुसार शर्तें निर्धारित की गई हैं :-
- Each corner of the lease area shall have a boundary pillar(corner pillar).
 - There shall be erected intermediate boundary pillars between the corner pillars in such a way that each pillar is visible from the adjacent pillar located on either side of it;
 - The distance between two adjacent pillars shall not be more than fifty meters;
 - The pillar shall be of square pyramid frustum shaped above the surface and cuboids shaped below the surface;
 - Each pillars shall be of reinforced cement concrete;
 - The corner pillar shall have a base of 0.3m X 0.3m and height of 1.30m of which 0.70m shall be above ground level and 0.60m below the ground;
 - The intermediate pillars shall have a base of 0.25m x 0.25m and height of 1.0m of which 0.70m shall be above ground level and 0.30 m below the ground;
 - All pillars shall be painted in yellow color and the top ten centimeters in red color by enamel paint and shall be grouted with cement concrete.
 - On all corner pillars, distance and being to the forward and backward pillars and latitude and longitude shall be marked;
 - Each pillar shall have serial number in a clockwise direction and the number shall be engraved on the pillars;
 - The number of pillars shall be the numbers of the individual pillar upon the total number of pillars in the lease;
 - The tip of all the corner boundary pillars shall be a square of 15 centimeter on which a permanent circle of 10 centimeter diameter shall be drawn by paint or engraved and the actual boundary point shall be intersection of two diameters drawn at 90 degrees.
 - The lease boundary survey shall be accurate within such limits of error as the Control General, Indian Bureau of Mines may specify in this behalf;

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14. The location and number of the pillars shall also be shown in the surface and other plans maintained by the lessee: and
15. In case of forest area within the lease, the size and construction and color of the boundary pillars shall be as per the norms specified by the Forest Department in this behalf.
16. The Survey Agency shall be responsible for the accuracy of the data collected during Survey.
17. Coordinates of boundary pillars shall be established in the World Geodetic System 1984 (WGS-84) Datum.
18. डी0जी0पी0एस0 सर्वे कार्य हेतु पारिश्रमिक का निर्धारण अधिमान्यता प्राप्त संस्थान एवं खनिज रियायतधारी के मध्य आपसी समन्वय से किया जायेगा। किसी भी प्रकार का आपसी विवाद होने पर राज्य शासन उत्तरदायी नहीं होगा।
19. डी0जी0पी0एस0 सर्वे कार्य के 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 अधिकृत एंजेसी की मान्यता किसी भी समय समाप्त की जा सकती है।
20. डी0जी0पी0एस0 सर्वे के संबंध में भारतीय खान ब्यूरो/राज्य शासन द्वारा समय-समय पर जारी निर्देशों का पालन अधिमान्यता प्राप्त संस्थान को करना होगा।
21. राज्य शासन द्वारा जारी यह अधिमान्यता केवल 03 वर्ष के लिए होगी। समयावधि समाप्ति से 03 माह पूर्व अधिकृत एंजेसी नवीनीकरण हेतु आवेदन कर सकेगा।
- 3/ यह अधिमान्यता नवकरण अधिसूचना के जारी होने की तिथि से 03 वर्ष के लिए ही मान्य होगी।

छत्तीसगढ़ के राज्यपाल के नाम से
तथा आदेशानुसार,

(जय प्रकाश मौर्य)

संयुक्त सचिव
छत्तीसगढ़ शासन
खनिज साधन विभाग

पृ0क्रमांक एफ 7-14/2013/12

अटल नगर, दिनांक नवम्बर, 2022
25 NOV 2022

प्रतिलिपि:-

1. सचिव, भारत सरकार, खान मंत्रालय, शास्त्री भवन, नई दिल्ली,
2. कंट्रोलर जनरल, भारतीय खान ब्यूरो, सेक्रेण्ड फ्लोर, ए-ब्लॉक, इन्दिरा भवन, सिविल लाईन्स, नागपुर(महाराष्ट्र)
3. उप खान नियंत्रक, क्षेत्रीय कार्यालय भारतीय खान ब्यूरो, दूसरी मंजिल, जी.एस.आई. फील्ड प्रशिक्षण केन्द्र, महालेखाकार आफिस काम्पलेक्स, पोस्ट विधानसभा, रायपुर
4. संचालक, भौमिकी तथा खनिकर्म, छत्तीसगढ़, द्वितीय तल, इन्द्रावती भवन, नवा रायपुर अटल नगर, जिला रायपुर (छत्तीसगढ़)
5. समस्त कलेक्टर, जिला _____ छत्तीसगढ़
6. अधिसूचना के पैरा-01 में उल्लिखित एंजेसी मेसर्स

की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु अग्रेषित

7. संचालक, शासकीय क्षेत्रीय मुद्रणालय, खैरागढ़ रोड़, राजनांदगांव, जिला राजनांदगांव(छत्तीसगढ़) की ओर साधारण राजपत्र में प्रकाशनार्थ।

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8. श्री श्रीकांत राव, उप संचालक(भौमिकी), क्षेत्रीय प्रमुख, संचालनालय भौमिकी तथा खनिकर्म, सोनाखान भवन, रिंग रोड नंबर-1, रायपुर(छत्तीसगढ़)। कृपया उक्त आदेश/अधिसूचना को संचालनालय की वेबसाईट में अपलोड करने का कष्ट करें।
9. गार्ड फाईल रजिस्टर



संयुक्त सचिव
छत्तीसगढ़ शासन
खनिज साधन विभाग

de 9

INTRODUCTION TO DGPS

The term DGPS stands for Differential GPS that is based on pseudo ranges, aka code phase. Even though the accuracy of code phase applications was given a boost with the elimination of Selective Availability (SA) in May 2000 consistent accuracy better than the 2.5-meter range still requires reduction of the effect of correlated ephemeris and atmospheric errors by differential corrections. Though the corrections could be applied in post-processing services that supply these corrections, most often operate in real-time. In such an operation pseudo range based versions can offer meter or even submeter results.

Differential GPS/DGPS

Positional Accuracy +/- 1 meter or so

• Same Satellite Constellation
(Base Station - Rover/or Rovers)

• Code Phase/Pseudorange
(Track 4 Satellites Minimum)

• Radio Link

- a) Less information than RTK
- b) Slower transmission
- c) Real-time or post-processed results

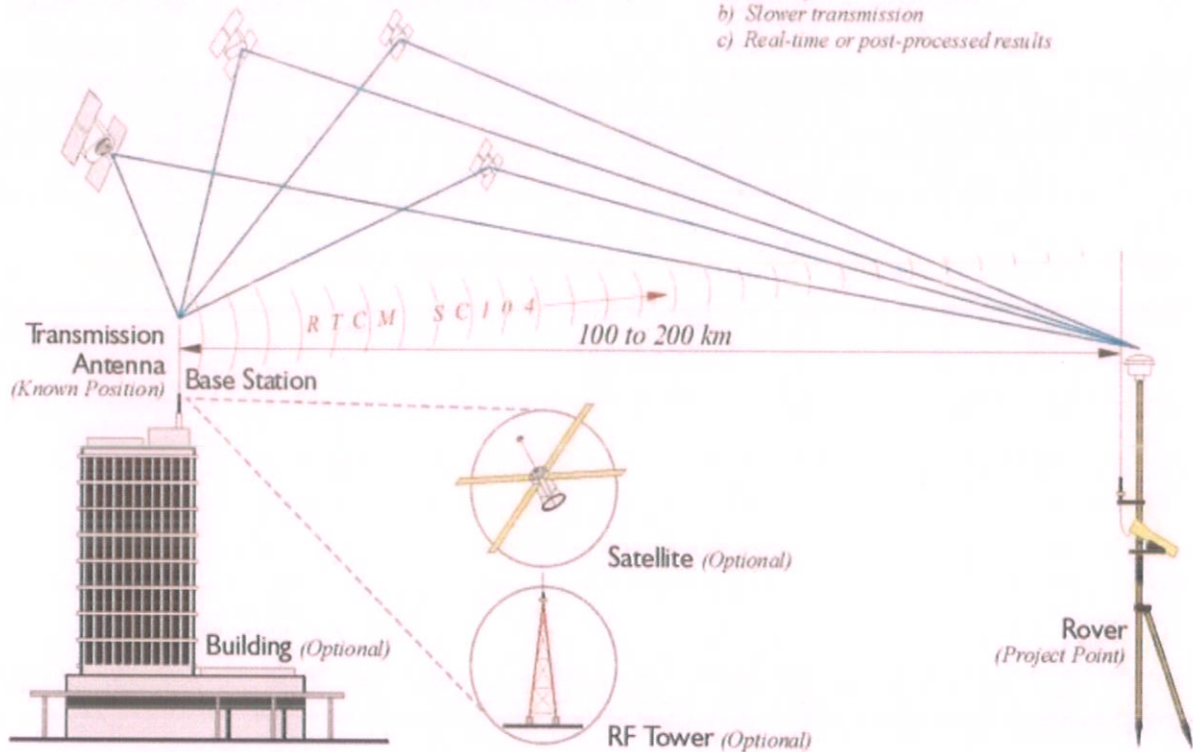


Fig. N0.1

Usually, pseudo range corrections are broadcast from the base to the rover or rovers for each satellite in the visible constellation. Rovers with an appropriate input/output (I/O) port can receive the correction signal and calculate coordinates. The real-time signal comes to the receiver over a data link. It can originate at a project specific base station or it can come to the user through a service of which there are various categories. Some are open to all users and some are by subscription only. Coverage depends on the spacing of the beacons, aka transmitting base stations, their power, interference, and so forth. Some systems require two-way, some one-way, communication with the basestations.

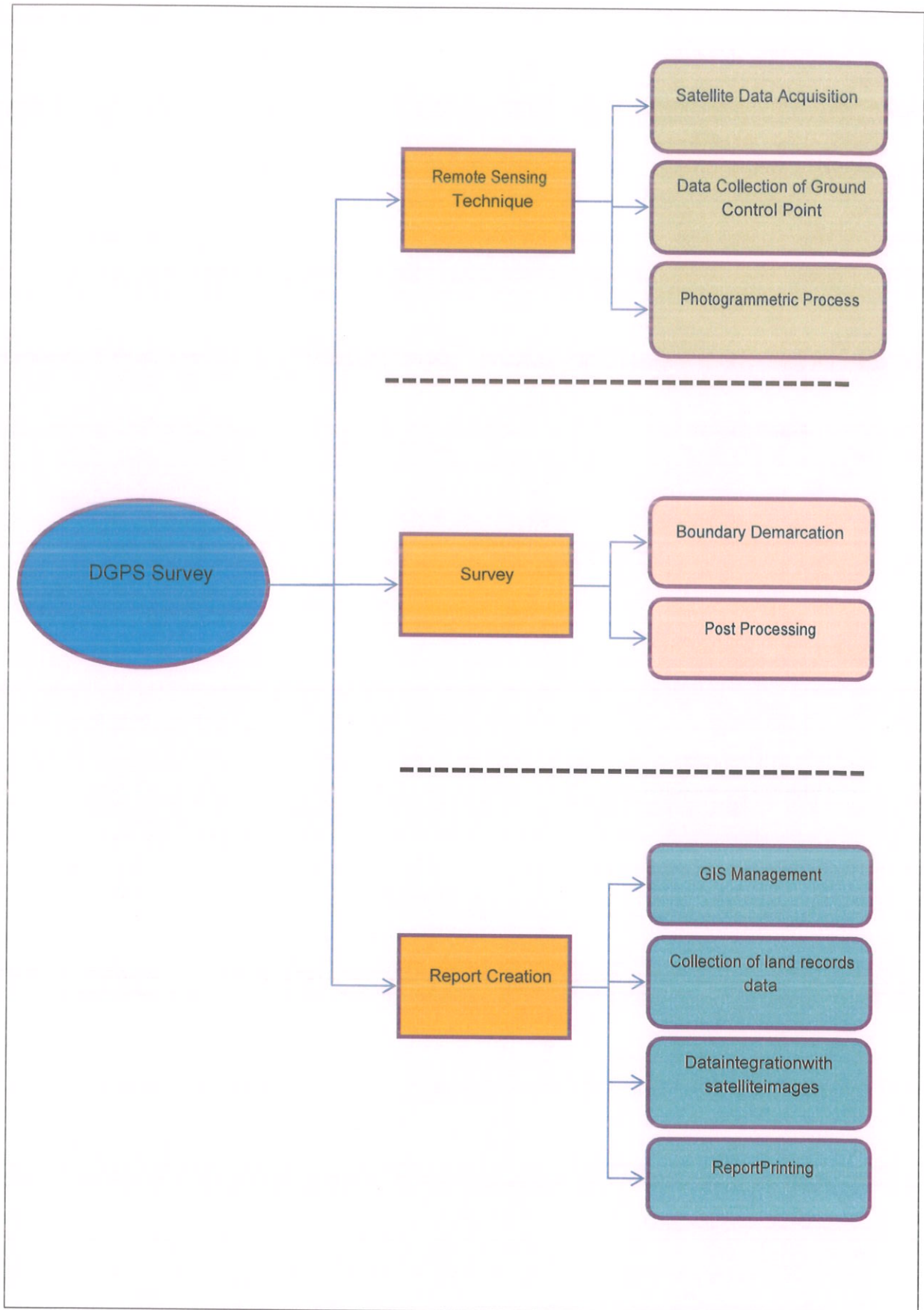


Fig. NO. 2

DGPS SURVEY METHODOLOGY (SOP):-

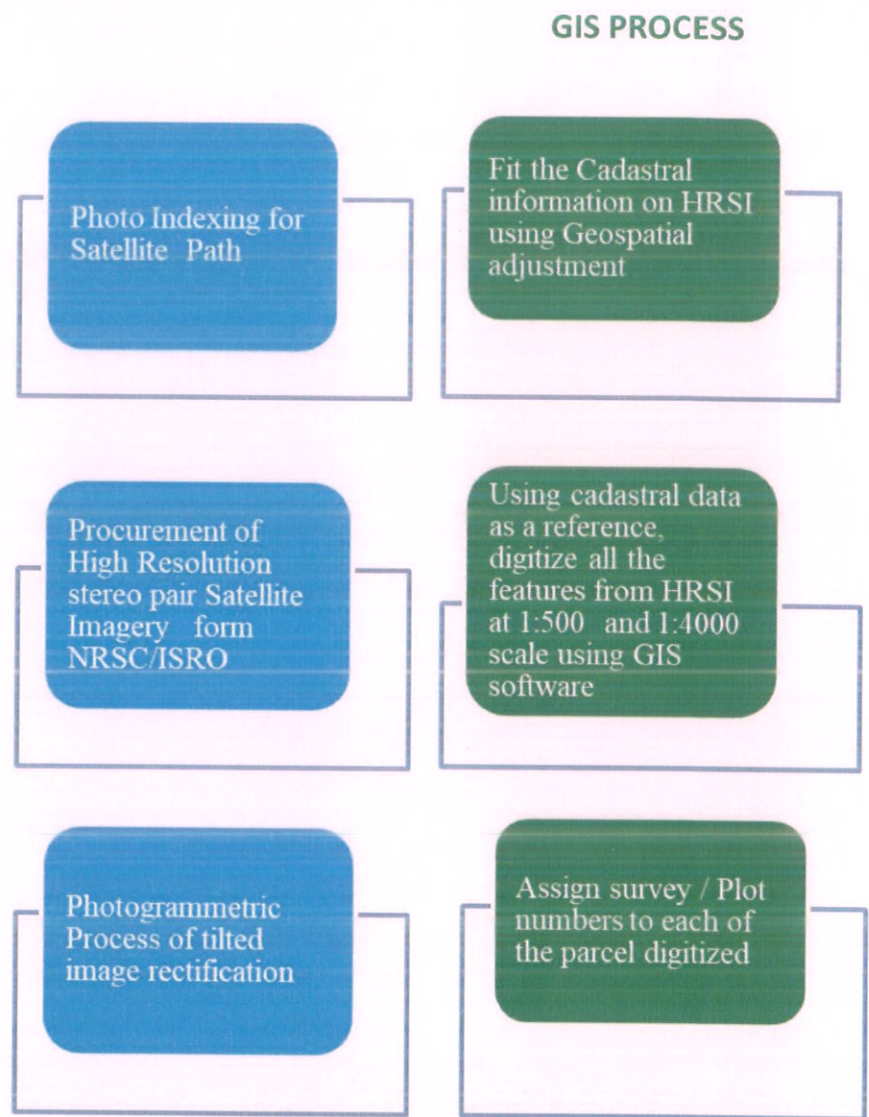


Fig. NO. 3

Establishment of Base stations (Control Points):

- Base Stations to be fixed by Multi/Dual frequency DGPS receivers with SOI Control Point as reference (to be supplied by SFD).
- The minimum observation time for base station shall be 12 hours from nearest SOI controlpoint.
- Required number of Control Points shall be established in such a way that the distance between the DGPS base station & rover shall be less than 10 km (for single frequency DGPS Rovers) and less than 50 km (for dual frequency DGPS Rovers).

- The panoramic view surrounding the Base Station as well as antenna location showing the terrain in near proximity should be digitally photographed (should be taken in three or four different directions) and documented.
- Rovers shall be of Dual/Multiple frequency DGPS receivers within a radius of 50 km from the base. In case Single frequency DGPS receivers are used they should be used within 10 km radius only. Readings of the BPs shall be taken with a minimum observation period of 15 minutes. To differentially correct the DGPS Rover data with base station / control point data. 1. In case real-time DGPS rovers are used, the Dual Frequency DGPS with OMNISTAR XP/HP connection shall be used alone and reading taken when accuracy is within 25cm.

MAP GENERATION

- All Revenue forest / Khasra Forest / Village forest / non-forest land recorded as forest land diversion / compensatory afforestation are to be shown on the georeferenced cadastral sheets (the drawn plot boundaries in the submitted map should match with corresponding plot boundaries of cadastral sheet) and co-ordinates of all the boundary demarcation points of the forest plots are to be shown with derived co-ordinates.
- The survey points used for Geo-referencing of cadastral sheet and the derived co-ordinate points are to be shown in different symbols.
- For the demarcation of R.F and P.F patch boundaries proposed for diversion / compensatory afforestation should be carried out only using the DGPS / ETS surveyed points.
- During map generation the survey agency must compare the allotted area with map / surveyed area and if a variation of more than 5% between allotted area and map area is observed, then the plot wise variation must be brought to the notice of concerned officer through the user agency for necessary correction and after necessary correction the data should be submitted for verification.
- All forest areas proposed for diversion should be shown within approved project boundary / corridor and within DGPS/ETS surveyed ML boundary for ML areas.
- After this the data (both survey as well as maps) would be submitted to concerned department.

SURVEY METHOD

1. RTK (Real Time Kinematic)
2. STATIC METHOD

1. RTK (Real Time Kinematic):-

Most, not all, GPS surveying relies on the idea of differential positioning. The mode of a base or reference receiver at a known location logging data at the same time as a receiver at an unknown location together provide the fundamental information for the determination of accurate coordinates. While this basic approach remains today, the majority of GPS surveying is not done in the static post-processed mode. Post-processing is most often applied to control work. Now, the most commonly used methods utilize receivers on reference stations that provide correction signals to the end user via a data link sometimes over the Internet, radio signal, or cell phone and often in real-time.

In this category of GPS surveying work there is sometimes a distinction made between code based and carrier based solutions. In fact, most systems use a combination of code and carrier measurements so the distinction is more a matter of emphasis rather than an absolute difference. Well that's a bit of discussion about static surveying, but as you know, a good deal of GPS these days is done not static. Much work is now done with DGPS or real-time kinematic, RTK.

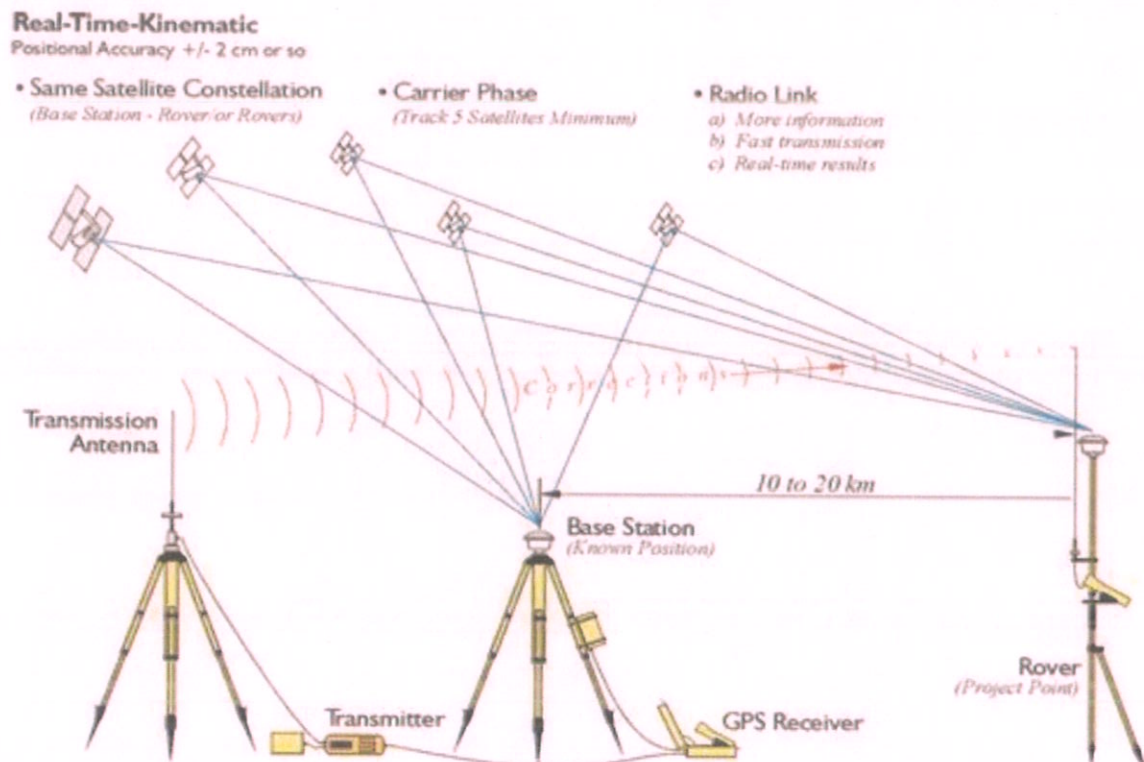


Fig. NO. 4

Real-time positioning is built on the foundation of the idea that, with the important exceptions of multipath and receiver noise, GPS error sources are correlated. In other words, the closer the rover is to the base the more the errors at the ends of the baseline match. The shorter the baseline, the more the errors are correlated. The longer the baseline, the less the errors are correlated.

The base station is at a known point, whether it was on a building permanently or it's a tripod mounted base station. The fact that it is in a known position allows the base station to produce corrections. The constellation is telling the base station that it is in a slightly different place, so corrections can be created to send to the rover at the unknown point. The corrections are applied in real time.

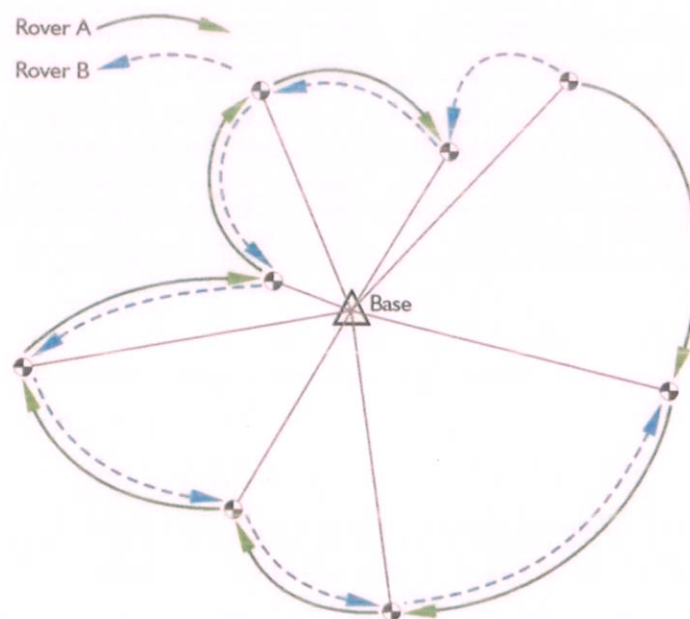


Fig. N0. 5

RADIAL GPS

Such real-time surveying is essentially radial. There are advantages to the approach. The advantage is a large number of positions can be established in a short amount of time with little or no planning. The disadvantage is that there is little or no redundancy in positions derived, each of the baselines originates from the same control station. Redundancy can be incorporated, but it requires repetition of the observations so each baseline is determined with more than one GPS constellation. One way to do it is to occupy the project points, the unknown positions, successively with more than one rover. It is best if these successive occupations are separated by at least 4 hours and not more than 8 hours so the satellite constellation can reach a significantly different configuration.

RTK and DGPS are radial. You have a known point in the middle, the base, and then the unknown points around it. This provides little geometric solidity. If there's an error in one of these radial base lines, it would be tough to catch it because there's no real redundancy. The illustration shows a way around this difficulty. There are two receivers, A and B, and it's possible by double occupation, one receiver going one way and the other going the other, by double occupying the unknown points to get some redundancy and some checks against the positions from a base. Another way to do it is to use one receiver. That receiver would occupy each point twice with four to eight hours between the first occupation and the second occupation on the point. Another way is to move the base to another known point. Then if you have vectors from another base into these points, you have a check. This approach allows a solution to be available from two separate control stations. Obviously, this can be done with reoccupation of the project points after one base station has been moved to a new control point, or a two base stations can be up and running from the very outset and throughout of the work as would be the case using two CORS stations. It is best if there are both two occupations on each point and each of the two utilize different base stations.

A more convenient but less desirable approach is to do a second occupation almost immediately after the first. The roving receiver's antenna is blocked or tilted until the lock on the satellites is interrupted. It is then reoriented on the unknown position a second time for the repeat solution. This does offer a second solution, but from virtually the same constellation.

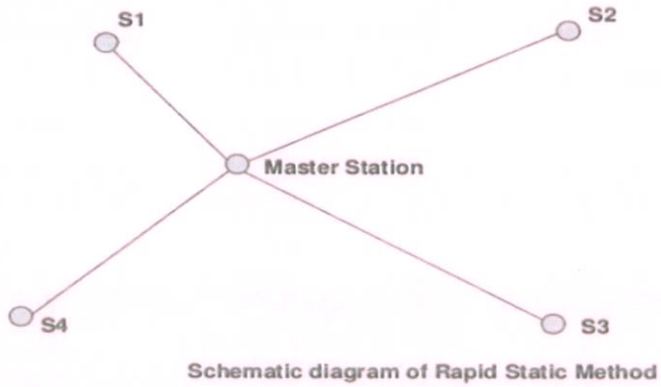
More efficiency can be achieved by adding additional roving receivers. However, as the number of receivers rises, the logistics become more complicated, and a survey plan becomes necessary. Also, project points that are simultaneously near one another but far from the control station should be directly connected with a baseline to maintain the integrity of the survey. Finally, if the base receiver loses lock and it goes unnoticed, it will completely defeat the radial survey for the time it is down.

These are a few possibilities to consider when you are doing a real-time survey.

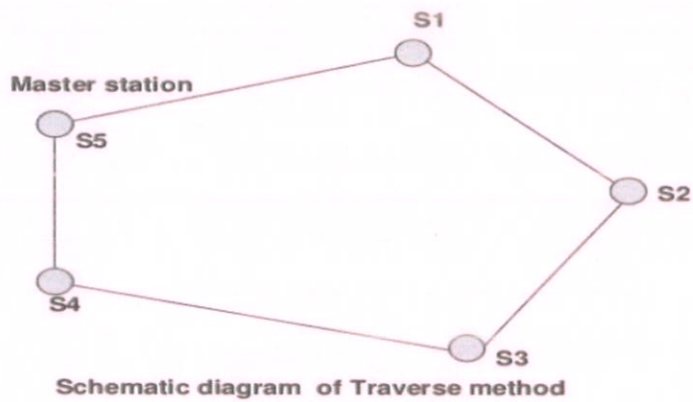
An advantage to continuously operating reference station network is that since those bases are operating simultaneously and all the time, it's possible to download the positions from more than one base and process your new position based on these continuously operating reference stations and have some redundancy.

2. STATIC METHOD:-

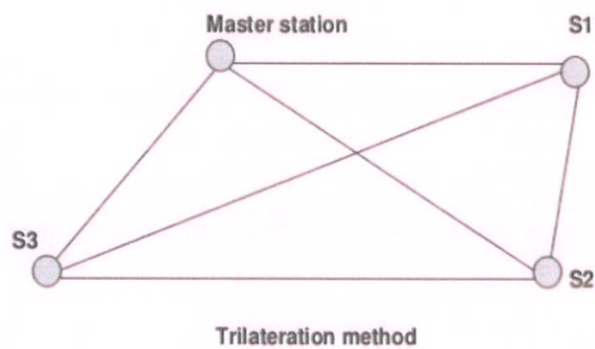
I. Rapid Static Method



II. Traverse Method



III. Trilateration Method



2. Scope of Work

1. Establishment of Ground Control Point with 72 Hours observation which covering approx. 15 km radius of the proposed route.
2. DGPS Survey for collection of ground coordinates along the boundary at every 50 m interval and/or at every turn/bend along the proposed trench.
3. Data processing and Interpretation
 - I. Geo-referencing of SOI Toposheet (scale 1:50000).
 - II. Creation of boundary vector map using the DGPS Surveyed data
 - III. Computation of area and preparation of Forest Area Statement for proposed diversion. It includes Reserved/Protected Forest/ Orange Area & Revenue Forest Land.
 - IV. Preparation of Geo-referenced map showing Area.
 - V. Superimposition of Area on Geo-referenced SOI Toposheet (scale 1:50000).
 - VI. Preparation of DGPS survey report along with soft copy of maps including shapefile format and kml file.
4. Preparation of Desired report, Geo-referenced maps and technical compliance in Hard copy and soft copy.

3. Deliverables

The deliverables envisaged for the assignment are described below -

1. Proposed Forest Diversion area statement as per DGPS Survey of proposed area.
2. Geo-referenced map showing forest area and superimposed on SOI maps based on DGPS observations – Hard and Soft Copy (Maps in PDF format, SHP and KML formats).
3. DGPS Survey and Mapping Reports containing Ground Control Points report as the primary Control Points.
4. DGPS Survey and mapping report on hard copy and soft copy in CD.

4. Technical Approach

The Primary Control Point (PCP) of DGPS Observation was established as the DGPS base station. The PCP was established near within 5 KM radius of surveyed area as per Survey of India (SOI) Guideline, the PCP is to be fixed through continuous observation. The observed data was processed with reference to the data of International GNSS Service (IGS) stations as per SOI guideline through Triemle software.

DGPS Survey Methodology

DGPS survey was carried out using a pair of DGPS instrument. One DGPS Instrument was used as Base Station. The first base station for the survey was established at the nearest TBM. The base is shifted using the Real Time Kinematic Survey method. The distance between the Base Station TBM and rover was always less than 5 km.

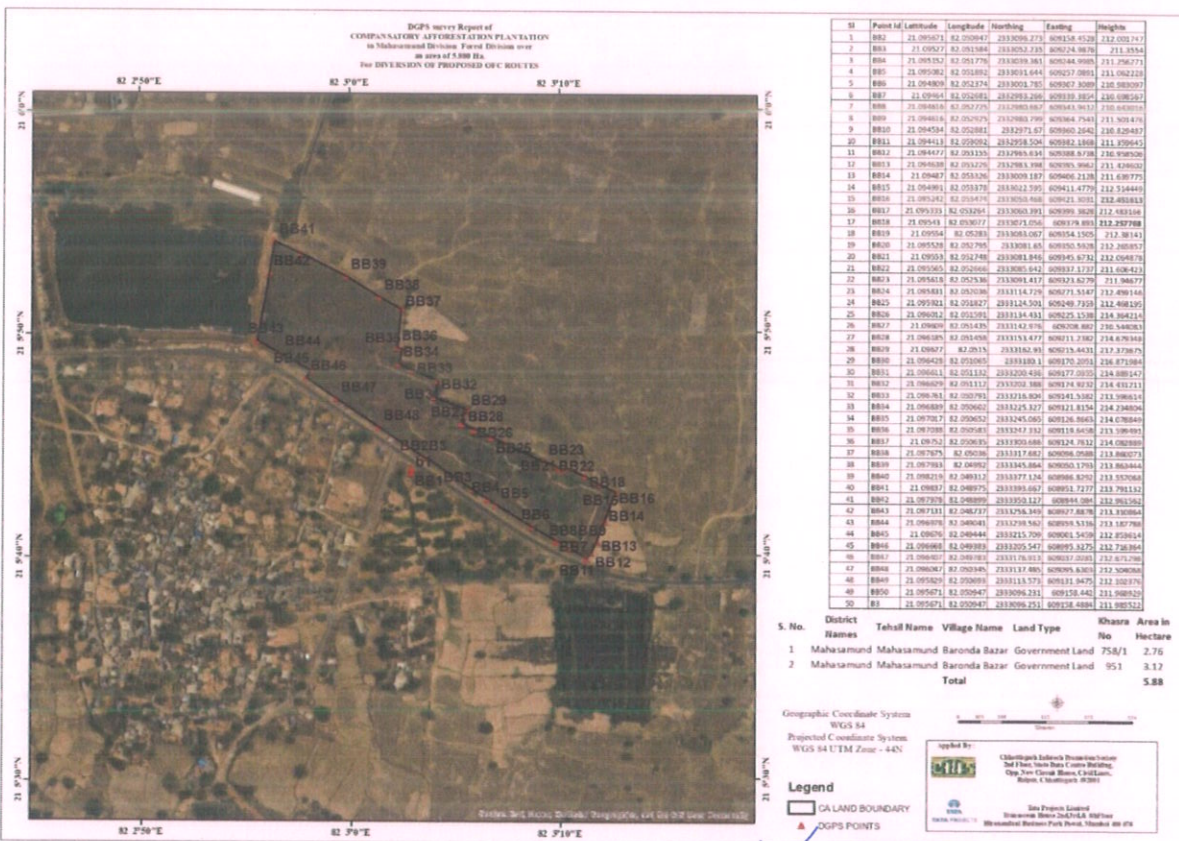
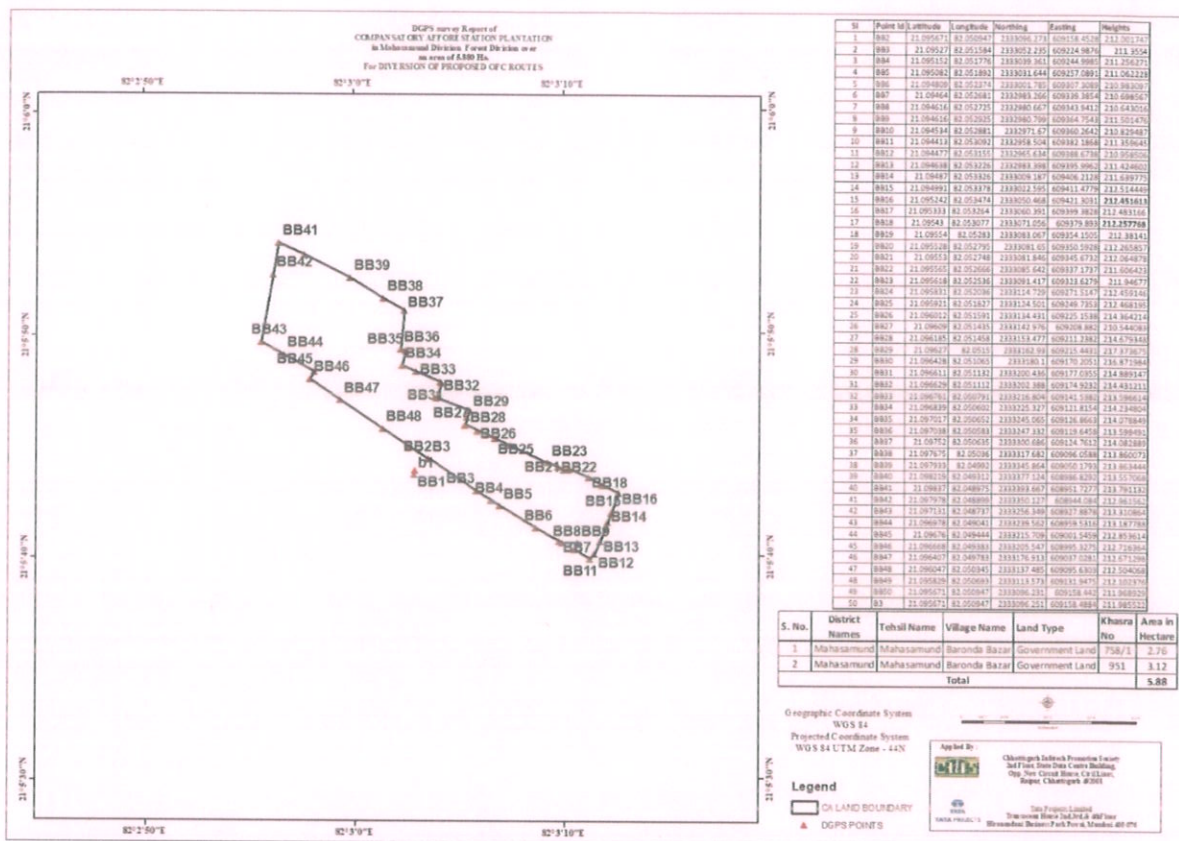
The other DGPS instrument was working as Rover. The survey was conducted in Real Time Kinematic (RTK) mode. The Survey team carried out DGPS Survey of boundary points by walking along the proposed Optical Fiber cable trench. DGPS readings were collected at every 50 m distance along boundry line and at every turn or bend.

During the survey the orange Area boundary was identified in the field with the help of staff from the forest department. The forest department staff also provided information regarding the forest range, compartment/Khasara number etc. The static data is Post Processed using Triamble Business Centre software for obtaining the coordinates. Geo-referencing of SOI Toposheets and Forest Maps has been done. SOI Toposheets and Forest Maps are geo-referenced based on the coordinates provided on the maps.

Creation of Vector Layers

The surveyed points captured through DGPS were plotted in the GIS Software and the Polygon and Polyline layers are created using the DGPS Surveyed points. Different layers such as the Forest Patch polygon, prepared. The vector layers prepared are then super-imposed on the Geo-referenced Toposheet and Georeference Forest map.

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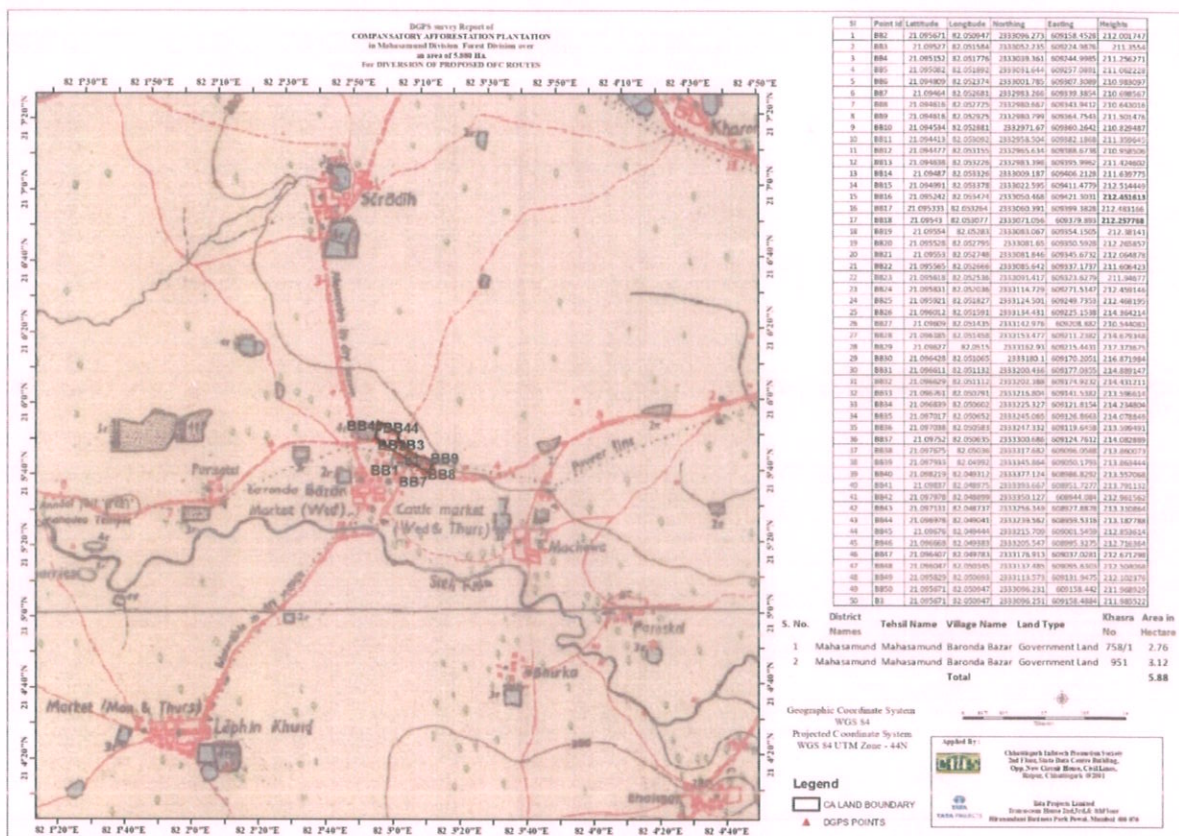


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Generation of Map and Survey Reports for Forest Diversion:

A map is created by overlaying the created vector data for the forest patches on the Geo-referenced SOI Toposheets / Forest Maps. The reports are generated for DGPS Points (with Lat/long) placed at the regular intervals of 10 m on the boundary line. Another report is generated having area calculation for the proposed CA Plantation Land area.

Specification of DGPS Equipment

RK Engineers and Consultants deployed the most advance and hi-precision devices to carry out the DGPS survey. The DGPS performance specifications are given below. The corresponding fact sheets are placed below for ready reference.

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DATASHEET

Trimble R8s

GNSS SYSTEM

One Receiver Configured for Today Scalable for Tomorrow

Rather than a pre-configured system, the Trimble® R8s GNSS system gives you just the features and benefits you need, in one flexible, scalable system. It's never been easier to build a system tailored to your job.

The Trimble R8s easily integrates with Trimble S-Series total stations and the innovative Trimble V10 imaging rover. Create a complete solution by combining the Trimble R8s receiver with a Trimble controller running Trimble Access® field software, and Trimble Business Center office software.

Configure and Scale With Ease

With the Trimble R8s, it's easy and simple to build a receiver that is right for the job. Choose the configuration level that suits your needs best, whether it's post-processing, base, rover, or a combination of base and rover functionality. After you've selected a configuration level, additional individual options can be added to further extend the receiver functionality.

The Trimble R8s offers the ultimate in scalability. As your requirements change, the Trimble R8s can adapt. Simply add functionality whenever you need it.

Trimble 360 Technology

Each Trimble R8s comes integrated with powerful Trimble 360 tracking technology that supports signals from all existing and planned constellations, and augmentation systems. Trimble 360 technology can expand the reach of your GNSS rover to sites that were previously inaccessible due to moderate vegetation or other obstructions by taking advantage of the availability of additional satellite signals.

The Trimble R8s includes two integrated Maxwell™ 6 chips and 440 GNSS channels. Capable of tracking a full range of satellite systems, including GPS, GLONASS, Galileo, BeiDou and QZSS.

Communication Options and Remote Access Via Web UI

The Trimble R8s GNSS receiver provides data communication options including an integrated wide-band UHF radio or 3G cellular modem.

Trimble's exclusive Web UI eliminates the need to travel for routine monitoring of base station receivers.

The Complete Solution

Create an industry-leading field solution by pairing the Trimble R8s GNSS receiver with a powerful Trimble controller loaded with our easy-to-use Trimble Access field software.

Trimble Access field software offers the features and capabilities to simplify everyday work. Our streamlined workflow modules such as Roads, Monitoring, Mines, and Tunnels guide crews through common project types, enabling them to get the job done faster. Survey companies can also implement their unique workflows by taking advantage of the customization capabilities available in the Trimble Access Software Development Kit (SDK).

Once you're back in the office, Trimble Business Center enables you to check, process and adjust your data with confidence. No matter what Trimble solution you use in the field, you can trust that Trimble Business Center office software will help you generate industry leading deliverables.

Trimble Mobile App—A New Way to Quickly Collect GNSS Raw Data

The Trimble DL Android app provides a simple and easy to use mobile interface for collecting static GNSS raw data for post-processing purposes without the need of using a Trimble controller or Trimble Access field software. This free of charge app is available through the Google Play Store and operates on Android smart phones and tablets.

Key Features

- ▶ One configurable receiver that is scalable for future needs
- ▶ Available in post-processing, base only, rover only, or base & rover configurations
- ▶ Advanced satellite tracking with Trimble 360 receiver technology
- ▶ Includes Trimble Maxwell 6 chips with 440 channels
- ▶ Simple integration with Trimble S-Series Total Stations and the V10 Imaging Rover
- ▶ Intuitive Trimble Access Field Software and Trimble Business Center Office Software



TRANSFORMING THE WAY THE WORLD WORKS



Chhattisgarh BharatNet Phase-II Project

DATASHEET

Trimble R8s GNSS SYSTEM

PERFORMANCE SPECIFICATIONS¹

Measurements

- Advanced Trimble Maxwell 6 Custom Survey GNSS chips with 440 channels
- Future-proof your investment with Trimble 360 tracking
- High precision multiple correlator for GNSS pseudorange measurements
- Unfiltered, un-smoothed pseudorange measurements data for low noise, low multipath error, low time domain correlation and high dynamic response
- Very low noise GNSS carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- Signal-to-Noise ratios reported in dB-Hz
- Proven Trimble low elevation tracking technology
- Satellite signals tracked simultaneously:
 - GPS: L1C/A, L1C, L2C, L2E, L5
 - GLONASS: L1C/A, L1P, L2C/A, L2P, L3
 - SBAS: L1C/A, L5 (for SBAS satellites that support L5)
 - Galileo: E1, E5A, E5B
 - BeiDou (COMPASS): B1, B2
- SBAS: QZSS, WAAS, EGNOS, GAGAN
- Positioning rates: 1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz

POSITIONING PERFORMANCE²

Code differential GNSS positioning

Horizontal	0.25 m + 1 ppm RMS
Vertical	0.50 m + 1 ppm RMS
SBAS differential positioning accuracy ³	typically <5 m 3DRMS

Static GNSS surveying

High-Precision Static

Horizontal	3 mm + 0.1 ppm RMS
Vertical	3.5 mm + 0.4 ppm RMS
Static and Fast Static	
Horizontal	3 mm + 0.5 ppm RMS
Vertical	5 mm + 0.5 ppm RMS

Postprocessed Kinematic (PPK) GNSS surveying

Horizontal	8 mm + 1 ppm RMS
Vertical	15 mm + 1 ppm RMS

Real Time Kinematic surveying

Single Baseline <30 km

Horizontal	8 mm + 1 ppm RMS
Vertical	15 mm + 1 ppm RMS

Network RTK⁴

Horizontal	8 mm + 0.5 ppm RMS
Vertical	15 mm + 0.5 ppm RMS
Initialization time ⁵	typically <8 seconds
Initialization reliability ⁶	typically >99.9%

HARDWARE

Physical

Dimensions	19 cm x 10.4 cm (7.5 in x 4.1 in), including connectors
Weight	1.52 kg (3.35 lb) with internal battery, internal radio and antenna

381 kg (840 lb) items above plus range pole, controller & internal radio

Operating Temperature⁷ -40 °C to +65 °C (-40 °F to +149 °F)

Storage Temperature⁸ -40 °C to +75 °C (-40 °F to +167 °F)

Humidity 100%, condensing

Ingress Protection IP67 dustproof, protected from temporary immersion to depth of 1 m (3.28 ft)

Shock and vibration Tested and meets the following environmental standards:

Shock Non-operating: Designed to survive a 2 m (6.6 ft) pole drop onto concrete. Operating: to 40 G, 10 msec, sawtooth

Vibration MIL-STD-883C, FIG. 514.5C-1

ELECTRICAL

- Power 10.5 V DC to 28 V DC external power input with over-voltage protection on Port 1 (7-pin Lemo)
- Rechargeable, removable 7.4 V, 2.8 Ah Lithium-ion smart battery
- Power consumption is <3.2 W in RTK rover mode with internal radio and Bluetooth[®] in use⁹
- Operating times on internal battery¹⁰:
 - 450 MHz receive only option 5.0 hours
 - 450 MHz receive/transmit option (0.5 W) 2.5 hours
 - Cellular receive option 4.0 hours

COMMUNICATIONS AND DATA STORAGE

- Serial: 3-wire serial (7-pin Lemo) on Port 1, full RS-232 serial (Dsub 9 pin) on Port 2
- Radio Modem¹¹: fully integrated, sealed 450 MHz wide band receiver/transmitter with frequency range of 403 MHz to 473 MHz, support of Trimble, Pacific Crest, and SATEL radio protocols.
 - Transmit power: 0.5 W
 - Range: 3-5 km typical / 10 km optimal¹²
- Cellular¹³: fully integrated, sealed internal GSM/GPRS/EDGE/UMTS/HSPA+ modem option. CSD (Circuit-Switched Data) and PSD (Packet-Switched Data) supported. Global Operation:
 - Penta-Band UMTS/HSPA+ (850/900, 900, 1900, and 2100 MHz)
 - Quad-Band GSM/CSD & GPRS/EDGE (850, 900, 1800, and 1900 MHz)
- Bluetooth[®]: fully integrated, fully sealed 2.4 GHz communications port (Bluetooth)¹⁴
- External communication devices for corrections supported on Serial and Bluetooth ports
- Data storage: 56 MB internal memory, 960 hours of raw observables (approx. 1.4 MB/day), based on recording every 15 sec from an average of 14 satellites

Data Formats

- CMR, CMR+, CMR+, RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2 inputs and outputs
- 23 NMEA outputs, GSO, RT17 and RT27 outputs, supports BINEX and smoothed carrier

WebUI

- Offers simple configuration, operation, status, and data transfer
- Accessible via Serial and Bluetooth

Supported Trimble Controllers¹

- Trimble TSC3, Trimble Slate, Trimble CU, Trimble Tablet Rugged PC

CERTIFICATIONS

IEC 60950-1 (Electrical Safety); FCC OET Bulletin 65 (RF Exposure Safety); FCC Part 15.105 (Class B), Part 15.247, Part 90, PTCRB (AT&T); Bluetooth SIG, IC ES-003 (Class B); Radio Equipment Directive 2014/53/EU, RoHS, WEEE, Australia & New Zealand RCM; Japan Radio and Telecom MIC

1. Based on Trimble R8s GNSS receiver configuration. Radio frequency settings are country specific.
 2. Precision and reliability may be subject to anomalies due to multipath, obstructions, satellite geometry, and atmospheric conditions. The specifications stated recommend the use of stable mounts in an open sky view, EM and multipath clean environment, optimal GNSS constellation configurations, along with the use of survey practices that are generally accepted for performing the highest order surveys for the applicable application including occupation time appropriate for baseline length. Baselines longer than 30 km require precise ephemeris and occupations up to 24 hours may be required to achieve the high precision static specification.
 3. Depends on SBAS system performance.
 4. Network RTK PPM values are referenced to the closest physical reference station.
 5. May be affected by atmospheric conditions, signal multipath, obstructions and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.
 6. Receiver will operate normally to -40 °C, internal batteries are rated from -20 °C to +60 °C, optional external cellular modem operates to -40 °C.
 7. Tracking GPS, GLONASS and SBAS satellites.
 8. Varies with temperature and wireless data rate. When using a receiver and internal radio in the transmit mode, it is recommended that an external 6-Ah or higher battery is used. The specified operating times on an internal battery for the cellular receive option are in GSM CSD (Circuit-Switched Data) or GPRS/PSD (Packet-Switched Data) mode.
 9. Varies with terrain and operating conditions.
 10. Bluetooth type approvals are country specific.
 11. Specifications subject to change without notice.



Contact your local Trimble Authorized Distribution Partner for more information

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Generation of Map and Survey Reports for Forest Diversion

A map is created by overlaying the created vector data for the forest patches on the Geo-referenced SOI Toposheets. The reports are generated for DGPS Points (with Lat/long) placed at the regular intervals of 50 m on the proposed Khasara Boundary..

Geo-referenced Map

Area Demarcation of Different Forest Diversion Proposals

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5. Survey Results



Post-Processing Service Based on RTX Technology

TrimbleRTX.com

Contributor: geomapsengineering@gmail.com
 Reference Name: 10633320.T02
 Upload Date: 11/30/2022 15:19:00 UTC

Report Time Frame:
 Start Time: 11/28/2022 10:32:42 UTC
 End Time: 11/28/2022 11:20:28 UTC
 Observation File Type(s): T02
 Observation File(s): 10633320.T02
 Antenna:
 Name: TRMR8S NONE
 Height: 1.853 m
 Reference: Bottom of antenna mount
 Coordinate Systems: ITRF2014
 Tectonic Plate: India (Auto-detected)
 Tectonic Plate Model: MORVEL56
 Processing Interval: 10 s

Statistics

# Total Obs	# Usable Obs	# Used Obs	Percent
1434	286	282	98

Used Satellites

# Total Satellites:	21
GPS:	G01 G03 G04 G07 G08 G09 G14 G16 G21 G27 G30
GLONASS:	R01 R07 R08 R11 R21
BeiDou:	C09 C10 C11 C12 C14

Processing Results

ITRF2014 at Epoch 2010.0		
Coordinate	Value	σ
X	921733.452 m	0.072 m
Y	5918609.893 m	0.044 m
Z	2184746.820 m	0.028 m
Latitude	20° 09' 46.41589" N	0.024 m
Longitude	81° 08' 53.37283" E	0.071 m
El. Height	328.415 m	0.047 m

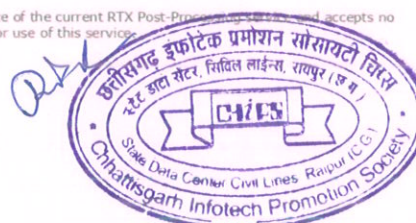
ITRF2014 at Epoch 2022.91		
Coordinate	Value	σ
X	921732.883 m	0.072 m
Y	5918609.810 m	0.044 m
Z	2184747.286 m	0.028 m
Latitude	20° 09' 46.43202" N	0.024 m
Longitude	81° 08' 53.39173" E	0.071 m
El. Height	328.416 m	0.047 m

Report Information

Trimble RTX Solution ID: 27013634
 Solution Type: Static
 Software Version: 8.5.1.20196
 Creation Date: 11/30/2022 15:19:07 UTC

Disclaimer

Trimble Navigation Limited does not guarantee availability, reliability, and performance of the current RTX Post-Processing service and accepts no legal liability arising from, or connected to, the use of information on this document or use of this service.



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6. DGPS Survey Results

The total area is 5.880 Hectare covered in Braunda Bazar Village of Mahasamund Tehsil. Land Area Statement Report is as below

S. No.	District Names	Division Name	Block Name	Range Name	Village Name	Land Type	Khasra No	Area in Hectare
1	Mahasamund	Mahasamund	Mahasamund	Mahasamund	Baronda Bazar	Government Land	758/1	2.760
2	Mahasamund	Mahasamund	Mahasamund	Mahasamund	Baronda Bazar	Government Land	951	3.120
Total								5.880

DGPS coordinates

Sl	Point Id	Latitude	Longitude	Northing	Easting	Heights
1	BB2	21.095671	82.050947	2333096.273	609158.4528	212.001747
2	BB3	21.09527	82.051584	2333052.235	609224.9876	211.3554
3	BB4	21.095152	82.051776	2333039.361	609244.9985	211.256271
4	BB5	21.095082	82.051892	2333031.644	609257.0891	211.062228
5	BB6	21.094809	82.052374	2333001.785	609307.3089	210.983097
6	BB7	21.09464	82.052681	2332983.266	609339.3854	210.698567
7	BB8	21.094616	82.052725	2332980.667	609343.9412	210.643016
8	BB9	21.094616	82.052925	2332980.799	609364.7543	211.501476
9	BB10	21.094534	82.052881	2332971.67	609360.2642	210.829487
10	BB11	21.094413	82.053092	2332958.504	609382.1868	211.359645
11	BB12	21.094477	82.053155	2332965.634	609388.6738	210.958506
12	BB13	21.094638	82.053226	2332983.398	609395.9962	211.424602

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Sl	Point Id	Latitude	Longitude	Northing	Easting	Heights
13	BB14	21.09487	82.053326	2333009.187	609406.2128	211.639775
14	BB15	21.094991	82.053378	2333022.595	609411.4779	212.514449
15	BB16	21.095242	82.053474	2333050.468	609421.3031	212.451613
16	BB17	21.095333	82.053264	2333060.391	609399.3828	212.483166
17	BB18	21.09543	82.053077	2333071.056	609379.893	212.257768
18	BB19	21.09554	82.05283	2333083.067	609354.1505	212.38141
19	BB20	21.095528	82.052795	2333081.65	609350.5928	212.265857
20	BB21	21.09553	82.052748	2333081.846	609345.6732	212.064878
21	BB22	21.095565	82.052666	2333085.642	609337.1737	211.606423
22	BB23	21.095618	82.052536	2333091.417	609323.6279	211.94677
23	BB24	21.095831	82.052036	2333114.729	609271.5147	212.459146
24	BB25	21.095921	82.051827	2333124.501	609249.7353	212.468195
25	BB26	21.096012	82.051591	2333134.431	609225.1538	214.364214
26	BB27	21.09609	82.051435	2333142.976	609208.882	210.544083
27	BB28	21.096185	82.051458	2333153.477	609211.2382	214.679348
28	BB29	21.09627	82.0515	2333162.93	609215.4431	217.373675
29	BB30	21.096428	82.051065	2333180.1	609170.2051	216.871984
30	BB31	21.096611	82.051132	2333200.436	609177.0355	214.889147
31	BB32	21.096629	82.051112	2333202.388	609174.9232	214.431211
32	BB33	21.096761	82.050791	2333216.804	609141.5382	213.596614
33	BB34	21.096839	82.050602	2333225.327	609121.8154	214.234804
34	BB35	21.097017	82.050652	2333245.065	609126.8663	214.078849
35	BB36	21.097038	82.050583	2333247.332	609119.6458	213.599491
36	BB37	21.09752	82.050635	2333300.686	609124.7612	214.082889
37	BB38	21.097675	82.05036	2333317.682	609096.0588	213.860073
38	BB39	21.097933	82.04992	2333345.864	609050.1793	213.863444
39	BB40	21.098219	82.049312	2333377.124	608986.8292	213.557068
40	BB41	21.09837	82.048975	2333393.667	608951.7277	213.791132
41	BB42	21.097978	82.048899	2333350.127	608944.084	212.961562
42	BB43	21.097131	82.048737	2333256.349	608927.8878	213.310864

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प्रा. परिक्षित अधिकारी
महासमुच्च

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Sl	Point Id	Latitude	Longitude	Northing	Easting	Heights
43	BB44	21.096978	82.049041	233239.562	608959.5316	213.187788
44	BB45	21.09676	82.049444	233215.709	609001.5459	212.853614
45	BB46	21.096668	82.049383	233205.547	608995.3275	212.716364
46	BB47	21.096407	82.049783	233176.913	609037.0281	212.671298
47	BB48	21.096047	82.050345	233137.485	609095.6303	212.504068
48	BB49	21.095829	82.050693	233113.573	609131.9475	212.102376
49	BB50	21.095671	82.050947	233096.231	609158.442	211.968929
50	B3	21.095671	82.050947	233096.251	609158.4884	211.985522

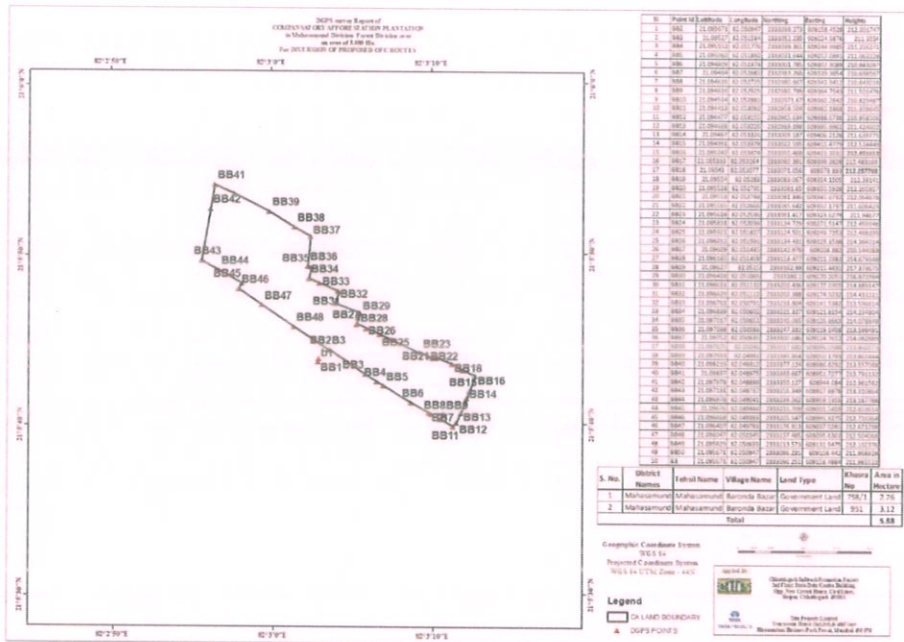
वन परिक्षेत्र अधिकारी

22/11/20



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6.1. Geo-Referenced Maps of the Proposed Route (Annexure-3)



Geo-Referenced Maps

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सामान्य वनमंडल महासमुन्द

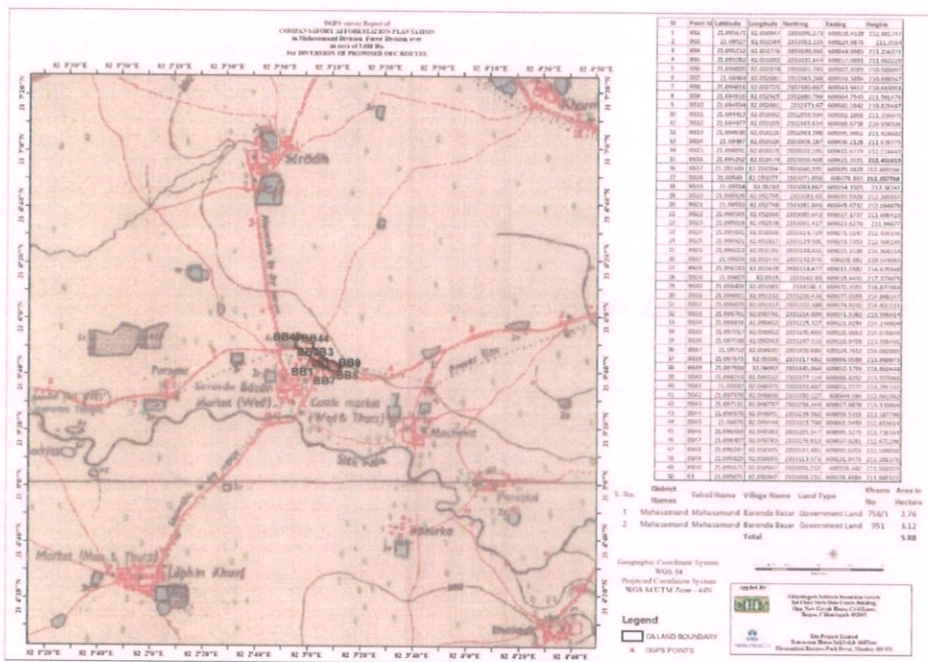
वन परिक्षेत्र अधिकारी
महासमुन्द



6.1.1. Map showing Geo-reference map

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6.1.2. Map showing Toposheet map.

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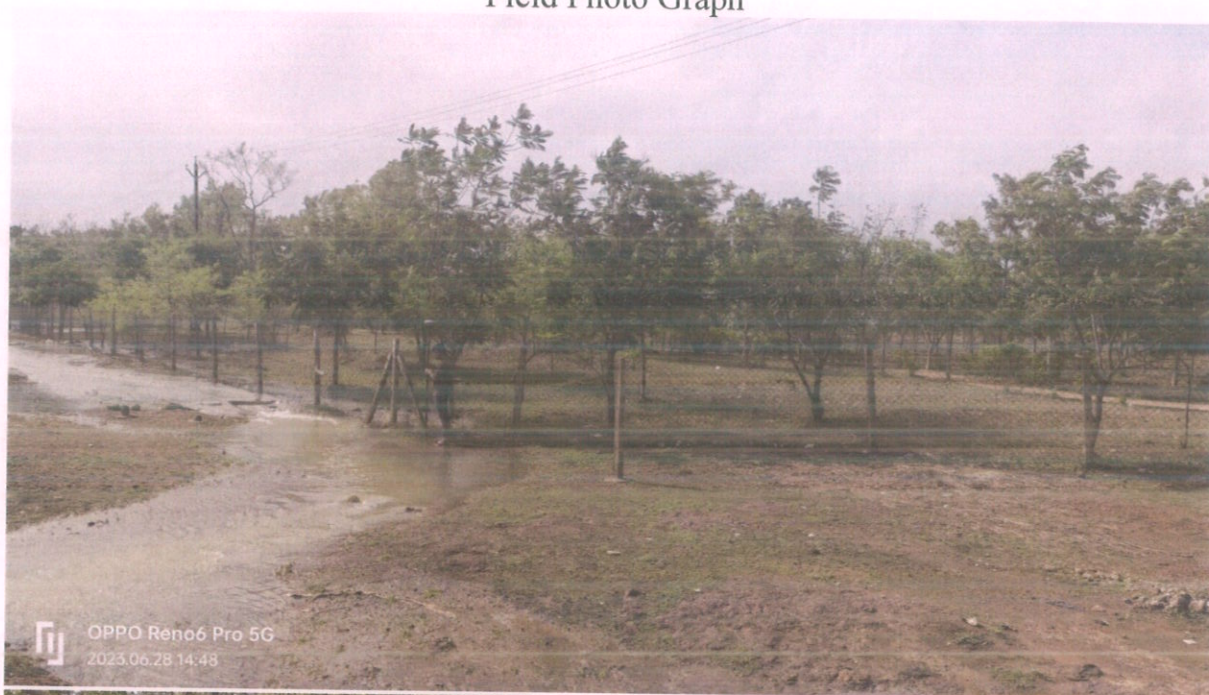
वनमंडल अधिकारी
सामान्य वनमंडल महासमुन्द

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Field Photo Graph



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